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ORGANIZATIONAL ANALYSIS OF THE UNITED STATES ARMY EVALUATION CENTER

December 2014

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13. ABSTRACT (maximum 200 words)

This study of the U.S. Army Evaluation Center (AEC) used an organizational systems framework to analyze factors related to strategy structure, processes and results experienced at AEC during fiscal year 2013. The researcher's experience, coupled with existing survey data collected from established questionnaires, interviews and authoritative information sources, was used to analyze AEC as a system.

The Organizational Systems Framework model used for this Joint Applied Project served as an excellent diagnostic tool to identify improvements to increase efficiency and effectiveness. Organization system analysis using the OSF model was successful in providing a baseline and key information required to design AEC for the future. It is recommended that AEC continue using the OSF to identify future improvements; focus on the factors that are within AEC's control to change (i.e., throughput factors) and focus on the factors with the greatest improvement potential. The organizational analysis showed that AEC achieves a "fairly strong" level of congruence between the inputs, throughputs and results. However, there are two areas where congruency among the factors is assessed as "weak," and 19 areas where congruency among the factors is assessed as "average." Recommendations to improve organizational performance were provided as a result of the analysis.

Although this research was successful in analyzing AEC as a system, many of the findings, recommendations, and conclusions drawn in this paper warrant dedicated and more in-depth quantitative analysis or consideration from different perspectives.

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ORGANIZATIONAL ANALYSIS OF THE UNITED STATES ARMY EVALUATION CENTER

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Submitted in partial fulfillment of the requirements for the degree of

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NAVAL POSTGRADUATE SCHOOL
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LIST OF ACRONYMS AND ABBREVIATIONS

AEC	Army Evaluation Center
CES	Civilian Education System
DASD(DT&E)	Deputy Assistant Secretary of Defense (Developmental Test & Evaluation
DAU	Defense Acquisition University
DOD	Department of Defense
DOT&E	Director, Operational Test & Evaluation
DT&E	Developmental Test & Evaluation
JAP	Joint Applied Project
M&S	Modeling and Simulation
MDA	Milestone Decision Authority
OT&E	Operational Test & Evaluation
PEO	Program Executive Office/Officer
PM	Program Manager
T&E	Test and Evaluation
OSF	Organizational Systems Framework

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I. INTRODUCTION

A. THESIS OVERVIEW

This joint applied project conducted an organizational analysis of the U.S. Army Evaluation Center (AEC) to describe how external and internal organizational factors impact AEC performance. AEC performance is in terms of organizational efficiency and effectiveness. Organizational efficiency is defined as the ratio of inputs to outcomes in the organization's transformation process (McShane & Glinow, 2009, p. 329). Operational effectiveness is a broad concept which includes the organization's fit with the external environment, internal subsystems configuration for high-performance, emphasis on organizational learning and the ability to satisfy the needs of the key stake holders (McShane & Glinow, 2009, p. 329). General systems theory and, in particular, an organizational systems model, provided the theoretical foundation for drawing conclusions and making recommendations concerning complex organizational behaviors. It shows the interrelationships between all of the factors that influence an organization. The approach assumes that that an organization can only be understood by examining the sum of all parts and at the level of congruence between them. Congruence is the degree to which the system components interact and create interdependencies between parts (Nadler & Tushman, 1980). The overall purpose was to analyze incongruence among key organizational variables and determine impact on mission. The intent was to assist leaders, managers, and practitioners in ways to improve the fit among relevant variables, thereby improving system or organizational performance.

B. METHODOLOGY

1. Research Question

The primary research question of this Joint Applied Project is "How can an organizational systems analysis be used to baseline the Army Evaluation Center and provide leadership with key information required to better design AEC for the future?" A greater understanding of an organization as a system is empowering to leaders. Analyzing an organization through a systems approach encourages practitioners to examine

interdependencies among the organization and environmental factors in a deliberate manner. It is essential to understand these interdependencies among variables, congruence or the relative "fit" of variables determines performance. The model is about cause-and-effect relationships, which may be far apart in time and/or location.

Secondary research questions focus on the congruence among key organizational variables and determine impact on mission: To what extent are the current organization framework factors congruent? The secondary research questions focus on the relationships amongst the factors and include:

To what extent are the inputs factors congruent with the throughput factors?

To what extent are the throughput factors congruent with each other?

To what extent are the throughput factors congruent with the outputs?

2. Literary Review

Articles and notes from courses attended at the Naval Postgraduate School were reviewed throughout the development of this paper, and those utilized are referenced. Additionally, summary data from various briefing slides, information papers and policies were referred to and referenced. Multiple articles located on the World Wide Web were reviewed and referenced. Additional information stemmed from the researcher's personal observations.

3. Description of the Organizational Systems Framework (OSF) Model

A description of AEC is provided in Chapter II using the OSF model to describe the organization as a system. Robert's OSF model was derived from the basic system model of inputs, processes and outputs (Roberts, 2000). Nadler and Tushman's congruence theory of organizations was applied to Robert's OSF model factors (Nadler & Tushman, 1980). Based on the model, the description is organized into three major subjects.

a. Inputs

Inputs are external influences or factors fed into the system. They may include raw data or pre-existing data provided by the external system to include:

- Environmental factors, such as political, economic, social, and technological forces or trends;
- Key factors for the organization to be successful; and
- System direction, to include its mission, vision, goals, strategic issues, and mandates.

b. Throughputs

Throughputs are factors involved with the transformation of input into output (also referred to as design factors). In this model, they include:

- Tasks–The basic tasks, jobs or core competencies of the organization;
- Technology–The condition of the facilities and equipment, work flow, activities involved in the work flow, etc.;
- Structure–The organization chart reflecting groupings of people, how tasks and/or roles are combined, etc.;
- People–Types of people making up the organization, types of experiences, skills, knowledge and abilities, motivational factors, etc.; and
- Processes–Planning, communication, human resource management, training plans, acquisition and contracting, etc.

c. Results

Results are intentional and unintentional end products of the system. They include:

- Culture–Includes the behavioral norms and values, how conflict is managed, impact of culture on the organization, informal patterns of interaction, etc.;
- Outputs–Results of the process on the input. This includes what the system has to offer (products or services), how they are measured, and indicators of performance; and
- Outcomes–How the outputs are viewed in terms of the environment and the consequences to the stakeholders.

To better understand the three main components of the OSF model, an illustration is provided in Figure 1 (Roberts, 2000). This figure serves as a ready reference for the reader throughout the paper.

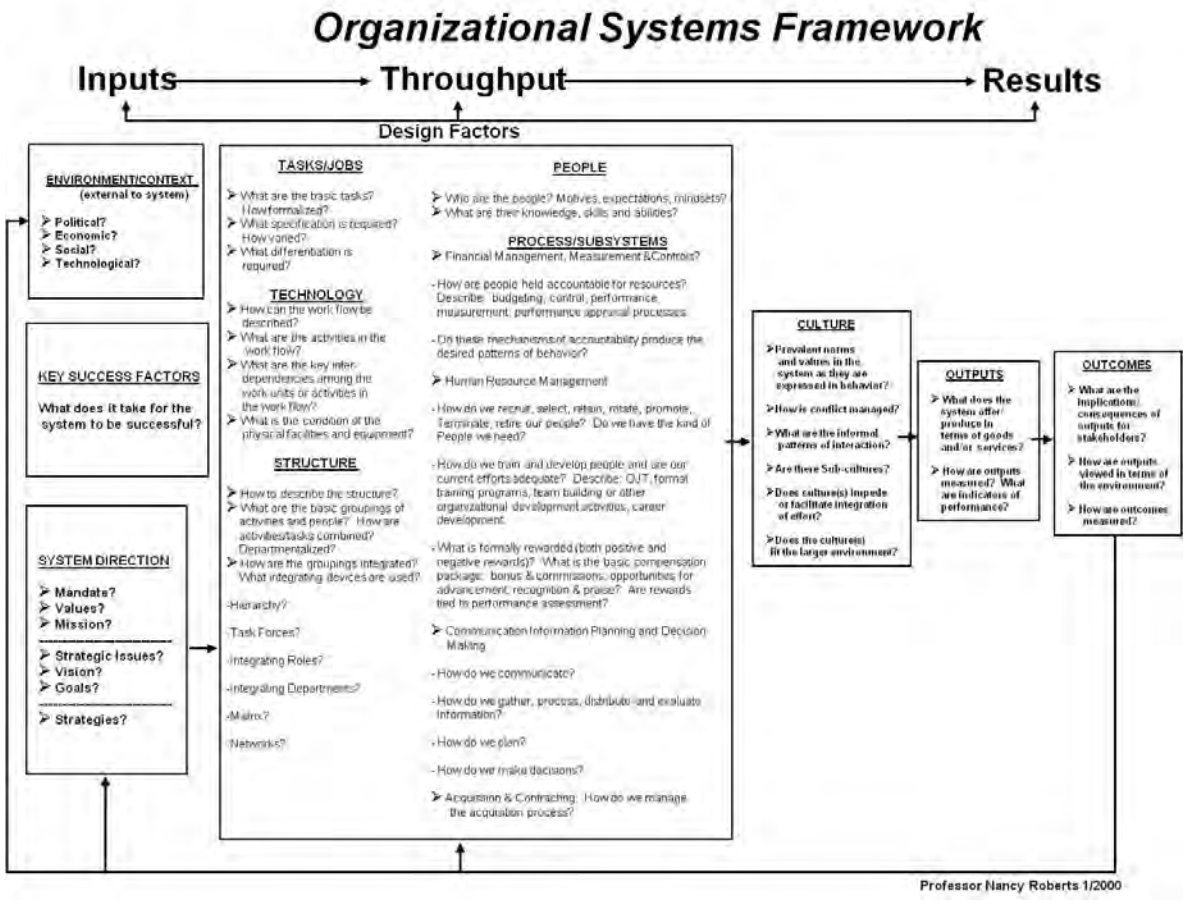

Figure 1. Organizational Systems Framework Model (from Professor Nancy Roberts, Naval Postgraduate School, 2000)

4. Chapter overview

Chapter II provides a background of the Defense Acquisition System, DOD test and evaluation and the Army test and evaluation organizations and their purposes. Chapter III describes AEC in terms of the OSF. Chapter IV presents the analysis of implementing the OSF by assessing the congruence between the inputs and throughputs, the throughputs and throughputs and the throughputs and results. Chapter V documents the findings and recommendations. Conclusions are found in Chapter VI Conclusions.

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II. BACKGROUND

A. DEFENSE ACQUISITION SYSTEM

The Defense Acquisition System is the management process by which DOD develops and buys weapons and other systems. It is governed by Directive 5000.01, The Defense Acquisition System, and Instruction 5000.02, Operation of the Defense Acquisition System, and utilizes the procedures described in the Defense Acquisition Guidebook. The primary objective of Defense acquisition is to acquire quality products that satisfy user needs with measurable improvements to mission capability and operational support, in a timely manner, and at a fair and reasonable price (Undersecretary of Defense (AT&L), 2003).

The generic model for the Defense Acquisition Management System is shown in Figure 2. The life cycle process consists of periods of time called phases separated by decision points called milestones. Some phases are divided into two efforts separated by program reviews. These milestones and other decision points provide both the PM and milestone decision authorities (MDAs) the framework with which to review acquisition programs, monitor and administer progress, identify problems, and make corrections. The MDA will approve entrance into the appropriate phase or effort of the acquisition process by signing an acquisition decision memorandum upon completion of a successful decision review (Undersecretary of Defense (AT&L), 2008).

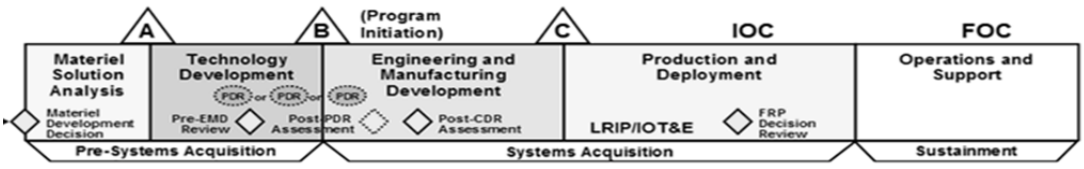

Figure 2. Defense Acquisition Management System (from Undersecretary of Defense (AT&L), 2008)

B. TEST AND EVALUATION

"The primary purpose of test and evaluation (T&E) is to support system development and acquisition by serving as a feedback mechanism in the iterative systems

engineering process" (United States Army, 2006). The standard T&E process currently used to support the acquisition of materiel is described in the DOD Defense Acquisition Guidebook (Department of Defense, 2013) and Army Regulation 73–1, Test and Evaluation Policy. The "product" of the Army T&E process is an understanding of system capabilities, which is documented in integrated (developmental and operational) evaluations used to inform production and fielding decisions. This process consists of the collection of data from tests, Modeling and Simulation (M&S), demonstrations and experiments in order to evaluate the technical performance, operational effectiveness, suitability, and survivability of the system under development. The purpose of T&E during the development and acquisition of a defense system is to identify and understand the areas of risk that must be accepted, reduced, or eliminated (Department of Defense, 2012, p. 23).

1. "Test" and "Evaluation"

a. Test

Test denotes any program or procedure that is designed to obtain, verify, or provide data for the evaluation of any of the following: (1) progress in accomplishing developmental objectives; (2) the performance, operational capability, and suitability of systems, subsystems, components, and equipment items; and (3) the vulnerability and lethality of systems, subsystems, components, and equipment items (Department of Defense, 2012, p. 77).

b. Evaluation

Evaluation denotes the process whereby data are logically assembled, analyzed, and compared to expected performance to aid in systematic decision making. It may involve review and analysis of qualitative or quantitative data obtained from design reviews, hardware inspections, M&S, hardware and software testing, metrics review, and operational usage of equipment (Department of Defense, 2012, p. 77).

c. Test and Evaluation

T&E is a process by which a system or components are tested and results analyzed to provide performance related information. This information has many uses, including risk identification and mitigation as well as providing empirical data to validate models and simulations. T&E enables an assessment of the attainment of technical performance, specifications, and system maturity to determine whether systems are operationally effective, suitable, and survivable for their intended use. There are three distinct types of T&E defined in statute or regulation: Developmental Test and evaluation (DT&E), Operational Test and Evaluation (OT&E), and Live Fire Test and Evaluation (LFT&E) (Department of Defense, 2012, p. 77).

The types and tasks of T&E as defined by the DAU Program Managers Tool Kit are shown in Table 1.

Developmental T&E (DT&E)	Operational T&E (OT&E)
Technical performance measurement	Operational effective/suitable/survivable
Developmental agency responsible (PM)	Operational Test Agency (OTA) responsible
Technical personnel	"Typical" user personnel
Limited test articles/each test	Many test articles/each test
Controlled environment	"Combat" environment/threats
Components, sub-systems, assemblies, systems	"Production Rep" test articles
Contractor involved	Contractor *may not* be allowed (IOT&E)

Table 1. Comparison of T&E Types and Tasks (from Parker, 2011 p. 62)

LFT&E is the term defined as "Major systems and munitions programs: survivability testing and lethality testing required before full-scale production." (10 U.S. Code 2355). LFT&E addresses two distinct types of testing–survivability and lethality (Department of Defense, 2012, p. 33).

2. Test and Evaluation Oversight.

The DOD organization for the oversight of T&E is illustrated in Figure 3 (Department of Defense, 2012, p. 10). For the USD(AT&L), DT&E oversight is performed by the DASD(DT&E), within the Office of the Assistant Secretary of Defense

for Research and Engineering (ASD(R&E)). The DOT&E provides OT&E oversight for the SecDef.

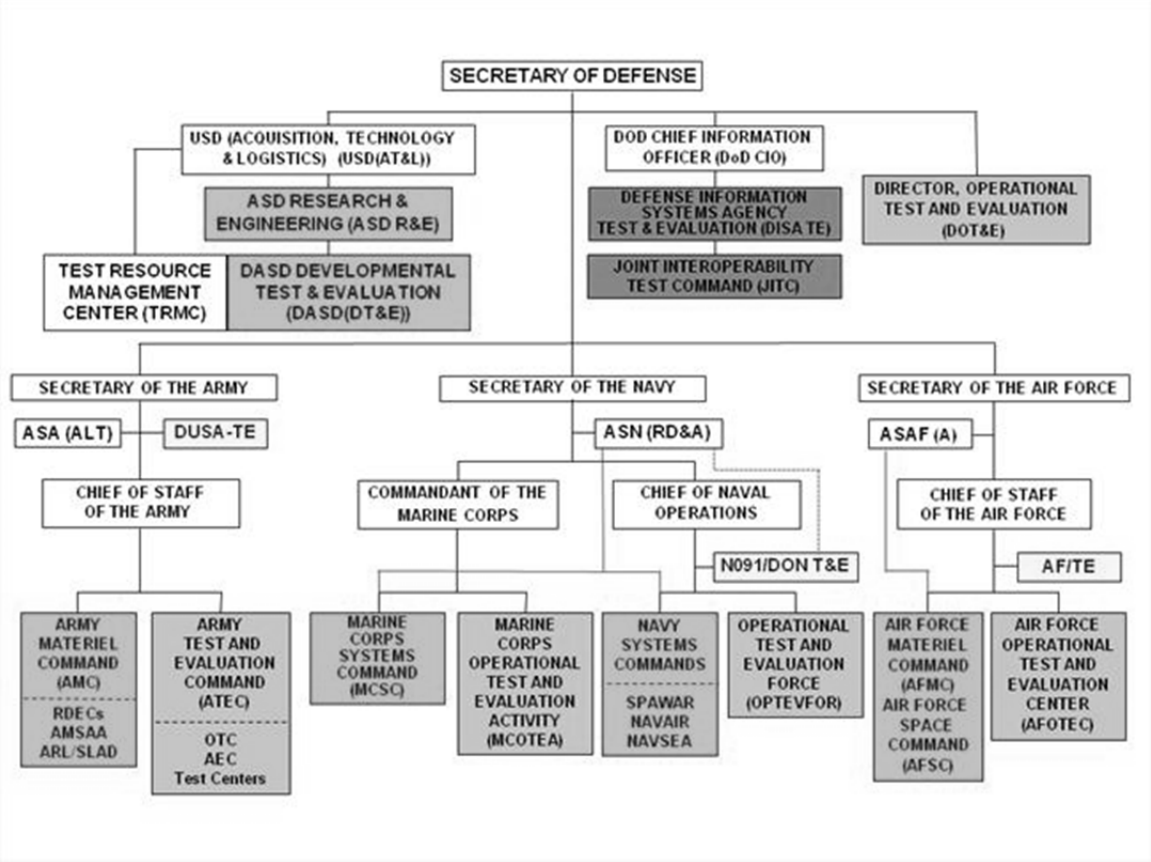

Figure 3. DOD T&E Organizations (from Department of Defense, 2012, p. 10)

C. ARMY TEST AND EVALUATION

1. Army Acquisition Executive (AAE)

The Assistant Secretary of the Army for Acquisition, Logistics, and Technology (ASA(ALT)) has the principal responsibility for all Department of the Army matters and policy related to acquisition, logistics, technology, procurement, the industrial base, and security cooperation. Additionally, the ASA(ALT) serves as the AAE. The AAE administers acquisition programs by developing/promulgating acquisition policies and procedures as well as appointing, supervising, and evaluating assigned program executive officers (PEOs) and direct-reporting PMs. The AAE serves as the Milestone Decision Authority on ACAT IC and ACAT IAC programs (Department of Defense, 2012, p. 15).

2. Army T&E Executive

The Army T&E Executive establishes; reviews, enforces, and supervises Army T&E policy and procedures including overseeing all Army T&E associated with the system research, development, and acquisition of all materiel systems and C4/IT systems. As delegated by the AAE, the Army T&E Executive is the sole Headquarters, Department of the Army (HQDA) approval authority for TEMPs.

The Test and Evaluation Office within the Office of the Deputy Under Secretary of the Army, known as the Deputy Under Secretary of the Army for Test and Evaluation (DUSA-TE), provides support for the Army T&E Executive. In this capacity, it has the mission to establish policy and resources that are disciplined and flexible enough to support safe and reliable equipment for the current and future Army and DOD chemical and biological defense. DUSA-TE also provides T&E subject matter expertise and oversight of Army and DOD chemical and biological acquisition programs and represents Army T&E interests at OSD and tri-Service committees and forums (Department of Defense, 2012, p. 15–16).

3. Army Test and Evaluation Command (ATEC)

The Army is unique among the services in having a single organization, Army Test and Evaluation Command (ATEC), which is responsible for developmental testing, operational testing, and the continuous (through all phases of a program's life cycle) integrated (developmental and operational) evaluation of materiel.

The ATEC commander is a major general who reports directly to the Vice Chief of Staff of the Army through the Director of the Army Staff (Department of the Army, 2006, p. 9). ATEC is comprised of subordinate commands. The Army Evaluation Center (AEC), headquartered at Aberdeen Proving Ground, Maryland, develops evaluation plans, determines data requirements and sources (analysis, developmental testing, operational testing, M&S, exercises), observes testing, and evaluates system effectiveness, suitability, and survivability (Department of the Army, 2006, p. 10) . AEC also provides testers with a safety release for systems before the start of pretest training for tests that use soldiers as test participants per AR 385–1 The Army Safety Program

and provides safety confirmations for milestone decision review and the materiel release decision (Department of the Army, 2013, pp. 8–9). The Operational Test Command, headquartered at Fort Hood, Texas, manages operational test centers throughout the U.S. and plans, conducts, and reports on operational tests (Department of the Army, 2006, p. 10). Six developmental test centers located throughout the U .S. plans, conducts, and reports on developmental tests: White Sands Missile Range, New Mexico; Aberdeen Test Center at Aberdeen Proving Ground, Maryland, Dugway Proving Ground (West Desert Test Center) at Dugway Proving Ground, Utah; Electronics Proving Ground at Fort Huachuca, Arizona; Redstone Test Center at Redstone Arsenal, Alabama; and Yuma Proving Ground (Cold Regions Test Center, Tropic Regions Test Center, Yuma Test Center) at Yuma Proving Ground, Arizona (Department of the Army, 2006, p. 10). ATEC organizational structure is shown in Figure 4.

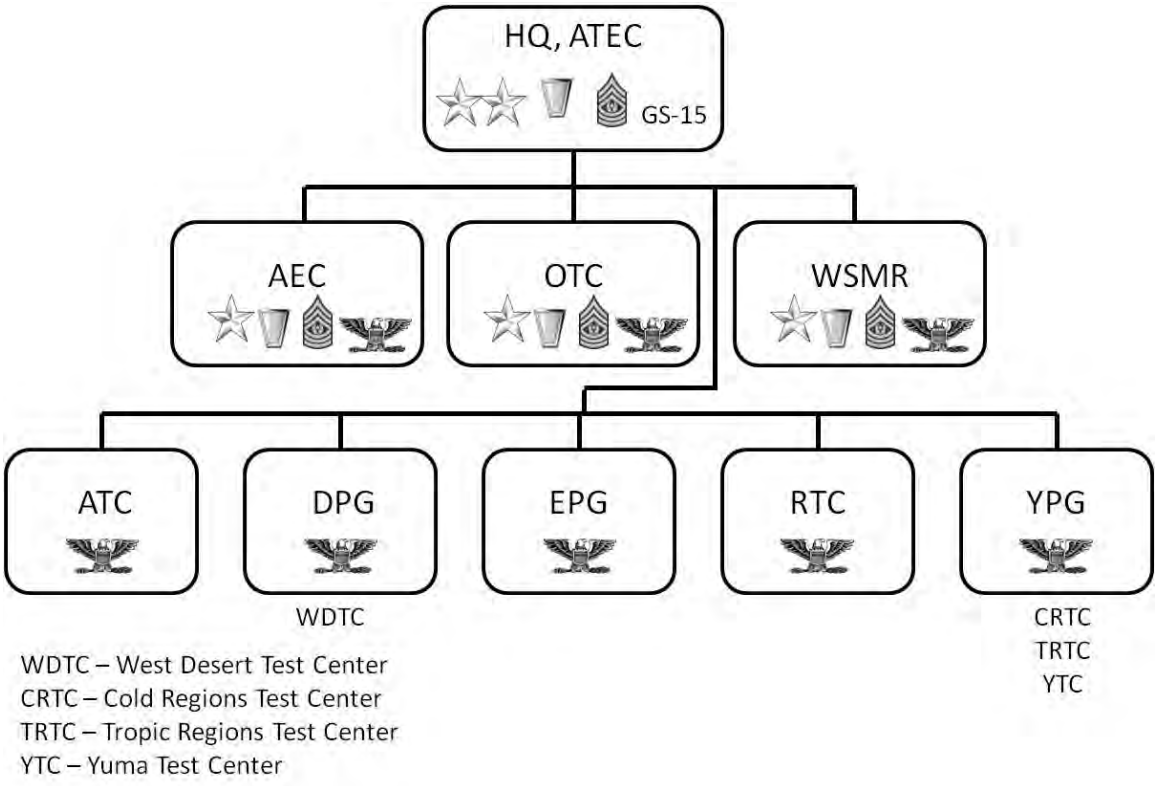

Figure 4. ATEC Organization (from Army Evaluation Center, 2011)

Also unique among the services is the fact that ATEC, as the Army's Operational Test Agency, is responsible for defining LFT&E requirements and reporting on LFT&E results (program managers assume this responsibility in other services). The unique characteristics of ATEC activities were endorsed by a 1999 Defense Science Board recommendation, which implicitly urged the other services to adopt the Army/ATEC model:

> Each of the Service DT&OT organizations should be consolidated, to include integrated planning, use of models, simulation and data reduction. Planning should be totally integrated, and the OSD T&E organizations consolidated. There should be integrated use of models, simulation and data reduction. Except for limited dedicated Operational Test and Evaluation (OT&E), contractor and government testing should also be integrated. (OSD AT&L, 1999, p. 3)

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III. DESCRIPTION OF AEC AS A SYSTEM USING THE OSF MODEL

The purpose of this section is to describe the AEC as a system using the Organizational Systems Framework (OSF) model. A system is defined as a set of interrelated components working towards a common purpose. The model is based on the concept of inputs, throughputs, and results. The input is what is received from the external environment and the output is what leaves the system, returning back into the environment. The transformation of the input by the system to an output is called the throughput (McShane & Glinow, 2009, pp. 6–7).

The basic systems approach to organizations acknowledges the existence of open systems; meaning they interact with other systems outside of themselves and this interaction includes inputs (what enters the system from outside) and outputs (what leaves the system for the environment). The OSF model breaks down these two components into subcategories and includes the throughput, which occurs between the inputs and outputs. As mentioned previously, inputs include the external environment, system direction, and key success factors. Throughput, referred to as Design Factors in the OSF, consists of tasks/jobs, technology, structure, people, and processes or subsystems. Culture, outputs, and outcomes make up the 'results' portion of the model (Roberts, 2000). To gain insight into AEC, the OSF model is applied based on the researcher's close experience working in the organization, briefing slides and other applicable documents from the center.

A. INPUTS

1. External Environment

The United States Army has endured a perpetual cycle of sustained combat operations for over 10 years. This, coupled with the austere fiscal climate, presents a challenging stage. In the OSF model, the external influences are categorized as political, technological, social, and economic factors which make up the environment where the system or organization exists (Roberts, 2000).

a. Political Forces

Army Secretary John McHugh commissioned a review and analysis of Army acquisition to determine lessons learned from past acquisition failures. Published in January 2011, the Decker/Wagner Task Force report: "Army Strong: Equipped, Trained and Ready: The Final Report of the Army Acquisition Review" reported the Army terminated 22 Major Defense Acquisition Programs (MDAP) of record before completion from 1990 to 2010 (Department of the Army, 2011, p. viii). Cancellations, schedule slippages, cost over-runs and failure to deliver timely solutions to the operators' requirements have caused Army leadership, Army leadership, OSD, Capitol Hill and industry to lose trust in the Army's acquisition processes and capability (Department of the Army, 2011, p. ix). The erosion in the core competencies of the personnel responsible for the development of requirements and the acquisition of systems and services, have exasperated the issue (Department of the Army, 2011, p. ix).

All acquisition activities can be impacted when changes in control of the Congress as a result of elections. The effects of elections are difficult to predict; but at a minimum, funding priorities will be reviewed and past decisions, positively or negatively affecting acquisition programs, could be revisited.

Congress requires the DOD to provide the following reports that include information on T&E:

- Selected Acquisition Report (SAR). This report consists of cost, schedule, and performance data. The SAR describes Acquisition Category (ACAT) I system characteristics required and outlines significant progress and problems encountered. It lists tests completed and issues identified during testing (10 U.S. Code § 2432).
- Director, Operational Test & Evaluation (DOT&E) Annual Report. This report is provided by the DOT&E to the Secretary of Defense and the committees on Armed Services, National Security, and Appropriations. The report provides a narrative and resource summary of all operational test and evaluation (OT&E) to include live-fire testing (LFT) and related issues, initiatives, other interest areas, activities, and assessments in the previous fiscal year (10 U.S. Code § 139).

- Beyond Low-Rate Initial Production (BLRIP) Report. Before proceeding to BLRIP for each major defense acquisition program (MDAP), the DOT&E must report to the SecDef, Deputy Secretary of Defense, Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)), Secretaries of the Military Departments, and Congress. This report addresses the adequacy of the Service initial operational test & evaluation (IOT&E) and whether the T&E results confirm that the tested item or component is effective, suitable, and survivable for combat. When oversight of live-fire test & evaluation (LFT&E) was moved to the DOT&E, the LFT Report was added to the BLRIP report content (10 U.S. Code § 2399).
- Foreign Comparative Testing (FCT) Report. The USD(AT&L) should notify Congress a minimum of 30 days prior to the commitment of funds for initiation of new FCT evaluations of equipment produced by select allied and friendly foreign countries (10 U.S. Code § 2350a.(g)).
- Joint Deputy Assistant Secretary of Defense for Developmental Test & Evaluation (DASD(DT&E)) and Deputy Assistant Secretary of Defense for Systems Engineering (DASD(SE)) Annual Report. This report is required by statute to be provided to the committees on Armed Services and Appropriations. The joint report includes the significant Developmental Test and Evaluation (DT&E) and systems engineering (SE) activities for the Department's MDAPs, major automated information systems (MAIS), and special interest programs. The report evaluates the progress of weapon systems' performance for programs designated for OSD T&E oversight (10 U.S. Code § 139).

b. Economic

(1) Department of Defense Budget

The economic component of the external environment is defined by the researcher as the national economy and the fiscal health of our nation. Although the political priorities identify where the spending goes, the economic component plays a significant role in determining how much there is to spend. The base budget of the U.S. Department of Defense (DOD) increased about 40 percent in real terms from 2001 to 2012. DOD must reduce spending by $487 billion from FY2012–FY2021 in order to comply with the Budget Control Act of 2011. (Department of Defense, 2012, p. 1).

Figure 5 highlights the difference between the current and previous drawdowns (Murdock, 2012).

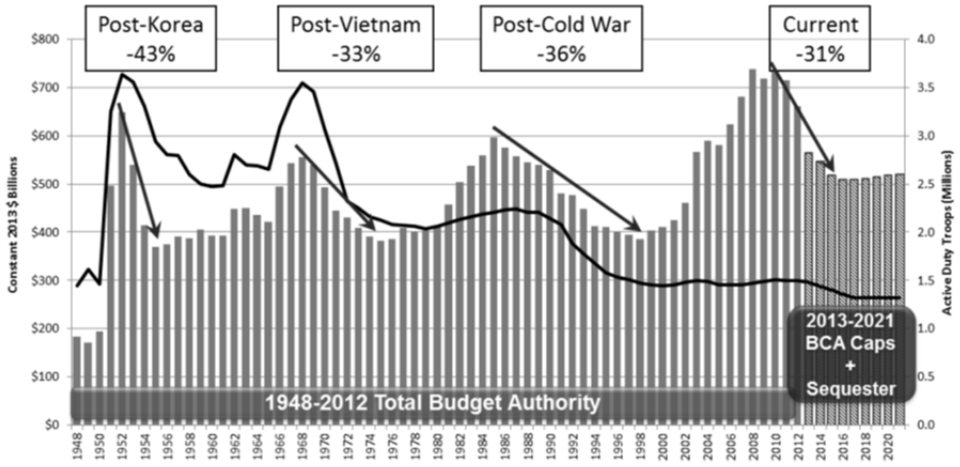


Figure 5. Budget Authority Draw-downs (from Murdock, 2012)

The aggregate impact of inflation in the cost of personnel, health care, operations and maintenance (O&M), and acquisitions results in a defense dollar that "buys" less and less capability. This internal cost inflation is driving DOD toward a zero-sum trade-off tween personnel end-strength and modernization. Operations and maintenance (O&M) costs have ballooned over the past few decades. In combination, inflation in the personnel, health care, operations and maintenance (O&M) accounts will squeeze funding for modernization (procurement and research, development, test, and evaluation [RDT&E]) in 2020, as depicted in Figure 6, if current trends are allowed to continue (Murdock, 2012).

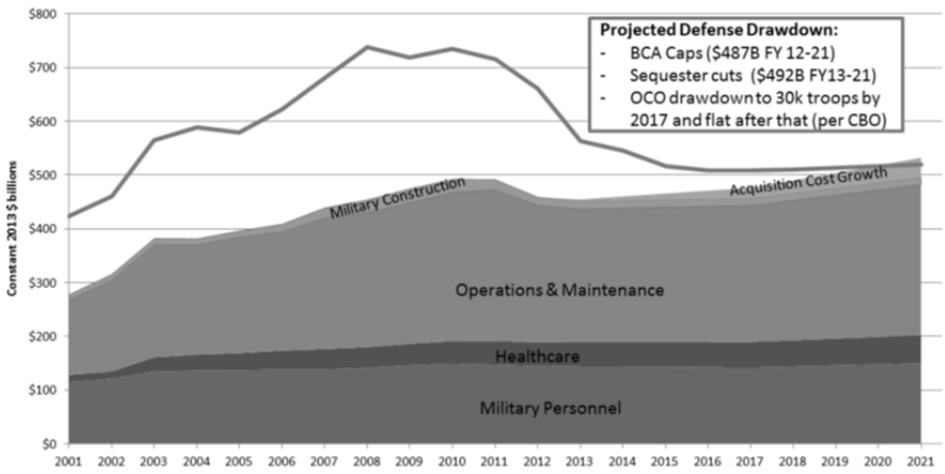


Figure 6. Projected Defense Top Line (from Murdock, 2012)

(2) AEC Budget

AEC is funded through the Research Development Test & Evaluation (RDT&E) appropriation account. The Defense Acquisition Portal ACQuipedia website describes RDT&E as "one of the five major appropriations used by the Department of Defense. RDT&E finances research, development, test and evaluation efforts performed by both contractors and government installations in the developing equipment, material, or computer application software. This includes services (including government civilian salaries), equipment, components, materials, end items and weapons used in such efforts."

Figure 7 presents AEC's FY99–FY19 budget profile, as derived from data from http://asafm.army.mil/offices/BU/BudgetMat.aspx?OfficeCode=1200, the Army Financial Management Budget Materials website.

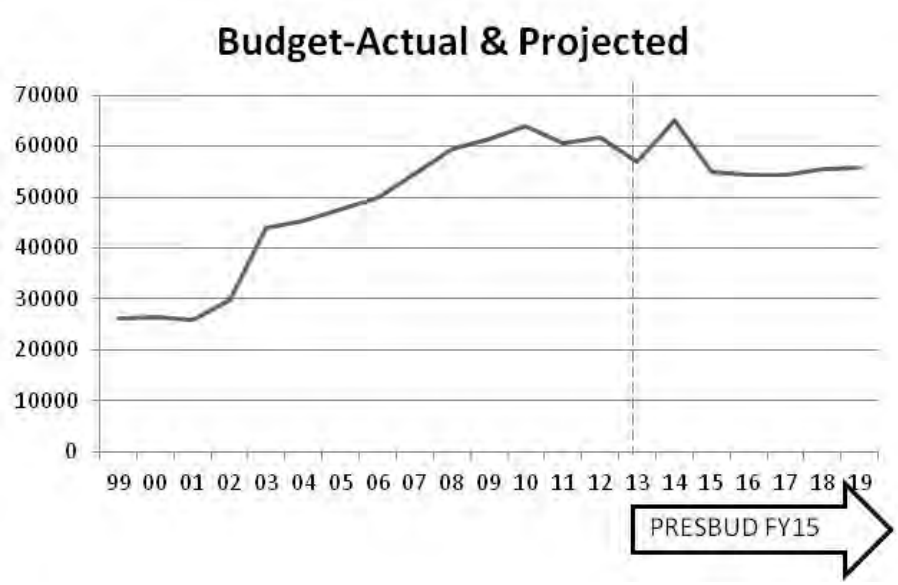


Figure 7. AEC Budget - Actual and Projected

(3) Civilian personnel fringe benefit rates

Office of Management and Budget (OMB) Circular A-21 requires agencies to use standard cost factors to estimate certain costs of government performance. These cost factors ensure that specific government costs are calculated in a standard and consistent manner to reasonably reflect the cost of performing commercial activities with government personnel. Civilian position, full-fringe benefits include four separate elements: (1) insurance and health benefits, (2) standard civilian retirement benefits (Social Security, Thrift Savings Plan, Federal Employees or Civil Service Retirement Systems), (3) Medicare benefits, and (4) miscellaneous fringe benefits. The agency pays for salaries and fringe benefits out of their local budget. OMB determined, based on information provided by OPM, that the civilian position, full-fringe benefit cost factor needs to be adjusted upward, from 30.3 percent in FY12 to 30.6 percent in FY13. This adjustment is necessary to account for increases in insurance and health benefits and civilian retirement benefits. This factor is based only on costs borne by the government (not enrollee premiums) and only on behalf of active federal employees (not retirees).

The DOD Civilian Personnel Fringe Benefits rates are published annually. These rates are used when obtaining reimbursement for services provided to agencies outside

the Federal Government. The average rate is 27.17 for FY99-FY14. The percentage increase from FY99 to FY13 is 21%. (Office of the Under Secretary of Defense (Comptroller), 2013).

c. Technological Advances

(1) Army Science & Technology Strategy

The Army Science & Technology (S&T) strategy seeks to develop and mature technology that will enable transformational capabilities in the future force while pursuing opportunities to accelerate technology maturity for transition into current force systems.

- Force Protection: technologies enable Soldiers and platforms to avoid detection, acquisition, and hit, penetration and kill.
- Intelligence, Surveillance and Reconnaissance (ISR) technologies enable persistent and integrated situational awareness and understanding to provide actionable intelligence that is specific to Soldier needs across the full range of military operations.
- Command, Control, Communications and Computers (C4) technologies provide capabilities for superior decision making, including intelligent network decision agents and antennas to link Soldiers and leaders into a seamless battlefield network.
- Lethality technologies enhance Soldiers' ability and platforms to provide overmatch against threat capabilities and include nonlethal technologies enabling tailorable lethality options.
- Medical technologies protect and treat Soldiers to sustain combat strength, reduce casualties and save lives.
- Unmanned Systems technologies enhance the effectiveness of unmanned air and ground systems through improved perception, cooperative behaviors and increased autonomy.
- Soldier Systems technologies provide materiel solutions that protect, network, sustain and equip Soldiers, and non-materiel solutions that enhance human performance.
- Logistics technologies enhance strategic response and reduce logistics demand.
- Military Engineering and Environment technologies enhance deployability

The impact of budget reductions within the Army's S&T portfolios is unknown. The National Military Strategy focuses on operations in the Pacific Rim, introducing increased complexity regarding operational environment. Technologies required to enhance Programs of Record (PORs) as well as replacing platforms, drives AEC to understand the technologies as well as how they will be employed in the operational context in order to provide future evaluations.

(2) Cyber Security

DOD weapons systems and information technologies operate in an increasingly complex, networked, joint information environment. Cyber security considerations generally apply to all acquisition systems because they interface to combinations of networks, platforms, support systems, or other elements of the operating environment that are potentially exploitable by cyber threats that are constantly evolving.

On January 2, 2013, President Obama signed the 2013 National Defense Authorization Act for 2013 (NDAA) into law. Congress included several targeted statutory provisions setting federal defense policy on a range of cyber security issues. ''The Secretary of Defense shall provide to the Committees on Armed Services of the House of Representatives and the Senate quarterly briefings on all offensive and significant defensive military operations in cyberspace carried out by the [DOD] during the immediately preceding quarter," the NDAA text reads. In a 1 Feb 13 memorandum, DOT&E directed the service OTAs to improve information assurance tests (cyber security) to be as rigorous and challenging as the cyber threats systems will face (Gilmore, 2013). The Army is collectively developing an overarching generic evaluation approach and identifying what testing is required from which organization. AEC will ultimately evaluate cyber for all covered systems and therefore, is the lead agency for developing the cyber evaluation capability.

(3) Systems of Systems

The Defense Acquisition Guidebook defines Systems of Systems (SoS) as "a set or arrangement of systems that results when independent and useful systems are integrated into a larger system that delivers unique capabilities." Mission-Based T&E

methodology was developed to enable robust and systematic SoS T&E. MBT&E focuses on the identification and alignment of system components and functions with the tactical missions and warfighting functions/tasks that the system supports. The approach facilitates testing in an ‘‘operationally realistic’’ environment and evaluating ‘‘in the mission context at the time of fielding.’’ Further, it facilitates the assessment of system functionality, the assessment of the effect of system functionality on operational capability, and the assessment of the capability of the warfighter to accomplish mission tasks (Wilcox, 2008).

(4) Network Integration Evaluation

To mitigate the budget constraints, the Army has constructed a series of Network Integration Evaluations (NIEs). The purpose of the NIEs is to work closer with industry to expedite the development of new capabilities. The NIEs are semiannual exercises conducted at White Sands Missile Range (WSMR), New Mexico, with the purpose of placing emerging technologies in the hands of Soldiers to evaluate them in realistic, combat-like scenarios. NIEs are used as the operational test venues for some programs of record.

The Agile Process was created to procure and align systems that meet a predefined operational need or gap identified for the force. These needs are identified within the Training and Doctrine Command (TRADOC) community and fed to the acquisition community, which then solicits potential solutions. TRADOC and the Army acquisition community must ensure those solutions are aligned to a newly developed or preexisting requirement in order to conduct procurement activities within the rules of the Defense Acquisition System (Department of Defense Instruction 5000.01/.02). AEC does not have a lead role in the Agile Process however, AEC provides safety releases for all systems participating in NIE.

d. Social Pressures

The Psychology Dictionary defines social pressures as “the influence that is exerted on a person or group by another person or group. It includes rational argument, persuasion, conformity and demands” (What is Social Pressure?, n.d.). The Army test and evaluation community receives significant and critical attention from the media, which is

a form of social pressure on the system. During FY13, ATEC was in the press for providing information on Distributed Common Grounds System-Army (DCGS-A) (program of record) and Palantir, a rapid initiative funded by the Army's Rapid Equip Force (REF). Palantir and DCGS are intelligence-gathering software programs designed to store and compute data for many purposes, including predicting IED locations. Representative Duncan Hunter was contacted by soldiers in Afghanistan, who relayed that the Army denied fielding Palantir as DCGS-A is the Army's program of record. ATEC tested and evaluated DCGS-A and concluded in April 2012 that DCGS-A was "overcomplicated, requires lengthy classroom instruction," and uses an "easily perishable skill set if not used constantly." Palantir was assessed in-theater by the ATEC Forward Operating Assessment team. The assessment report stated, "ninety-six of the 100 personnel surveyed agreed that Palantir was effective in supporting their mission. The overall feedback from the operators and immediate supervisors was that Palantir is a user-friendly and reliable program." The report also recommended purchasing additional Palantir systems (Carter, 2014).

An Army email requested that the original report be destroyed about one month after it was released. The report was replaced with a very similar report, minus the section recommending the increased purchase of Palantir. The report was corrected as ATEC does not recommend quantities of systems. The press perceived that the ATEC report was manipulated to prevent units from receiving the Palantir software in favor of DCGS-A (Carter, 2014).

2. Key Success Factors

According to the OSF model, an element that affects an organization's future success is contained in the question, "What does it take for the organization to be successful?" (e.g., what factors are crucial for success). These key factors may change from year to year based on the priorities and other external environmental issues. Success for the commercial world is straightforward and simple: maximize profit. In turn, this means selling products to customers at the right price, right time, and right cost.

In AEC system's case, there is no specific manual or document that explicitly calls out key success factors. Success factors support the AEC mission: provide information to decision makers.

Success factors include:

- Goal attainment–how successful AEC meets its strategic goals and objectives
- Resource utilization–how well AEC uses its available resources to meet the mission
- Adaptability–ability to change to fit with the constantly changing external environment.

3. System Direction

The system direction acts as the internal compass for the overall systems and includes its mission, vision and values. It also emphasizes strategies, goals and any mandates levied on the organization.

a. Mission

AEC's mission statement as documented on the AEC web-site is: "To plan, support, conduct and provide independent evaluations, assessments, and experiments in order to provide essential information to decision-makers" (AEC, 2013).

b. Vision and Values

AEC's vision statement is documented on the web-site:

> AEC exists to support the Army Test and Evaluation Command (ATEC) in meeting its responsibilities in defending our country and to help improve DOD's performance and accountability for the benefit of the American people. As a sub-command of ATEC, it is our responsibility to provide leadership and the customer the most effective, efficient, creditable, and reliable information. It is of the utmost importance for our organization to reflect excellence in all of our business operations, practices and professional endeavors. In our mission to support the Department of Defense (DOD), we seek to identify areas for improvement, and by doing so we promote the best business practices throughout DOD and the Department of the Army (DA). (AEC, 2013)

There are no specific AEC values as it draws from the values of the Army: loyalty, duty, respect, selfless service, honor, integrity and personal courage.

c. Strategic Plan–Goals and Objectives

AEC FY13 Strategic Plan focused on three strategic goals/objectives.

Goal 1. Organization that is a Great Place to Work

- Maintain an Organization of Talented Professionals
- Raise Workforce Credentials and Certifications
- Ensure good communications and transparency
- Increase team work
- Improve workforce quality of life

Goal 2. Continue to Improve Product Value to our Customers

- Optimize Tools and Processes to Enhance the Quality of our Products
- Enhance Relationships with our T&E Partners
- Listen to our Customers and Address their Feedback
- Work with stakeholder to ensure evaluation plans are adequate and efficient

Goal 3. Ensure the organization is structured for efficient operations

- Optimize the cost and means of Doing Business
- Continue to support the ATEC reorganization
- Ensure organizational roles are refined, while building cohesive, integrated teams
- Creating a flexible organization to respond to changing workload environment

d. Mandates

Statutes

Congress was concerned about past abuses where the DOD inappropriately rushed systems into production without adequate testing. Table 2 addresses the key statutes in Title 10 that specifically address T&E.

Topic	Title 10 Section
DOT&E access to all OT&E data & records	§139(e)(3)
DASD(T&E) access to all records and data	§139b(a)(6)
Initial OT&E required for combat systems	§2399(a)
DASD(T&E) Responsibilities of lead DT&E organization	§139b(c)(3)
DOT&E approval of OT&E plan adequacy	§2399(b)
DASD(T&E) approval of DT&E in TEMP	§139b(a)(5)(B)
DOT&E Report to Congress before going B-LRIP	§2399(b)(3), (4)
DASD(T&E) DT&E acquisition personnel	§139b(a)(5)(D)
DASD(T&E) Assess technological maturity/risk	§139b(a)(5)(F)
DOT&E or OTA approval of LRIP quantities	§2399(c)
Limits on system contractor involvement	§2399(d)
Limit on use of M&S and analysis alone	§2399(h)(1)
LFT&E of new "covered systems"	§2366(a)
LFT&E carried out sufficiently early	§2366(b)
LFT&E waivers & alternate plans (e.g., for aircraft)	§2366(c)
LFT&E B-LRIP Report to Congress before going B-LRIP	§2366(d)
LFT&E of "significant" mods to "covered systems"	§2366(e)
Production representative articles for OT&E	§2400(b)
Synopsis Report of EW Programs P.L. 103–160 §220	

Table 2. List of Statutes Governing T&E

(1) DOD Policy

OSD expands on Title 10 by imposing additional T&E requirements via CJCS 3170.01, DODD 5000.1, DODI 5000.2, other DODDs and DODIs, DOT&E and DASD(T&E) policy memos. Table 3 shows the list of directives and instructions governing T&E.

Number		Title
CJCS	3170.01	Joint Capability Integration and Development System Manual
DOD	3235.1-H	DOD Test and Evaluation of System Reliability, Availability and Maintainability A Primer
DODD	5000.1	The Defense Acquisition System
DODD	5010.41	DOD Information Security Program
DODD	5141.2	Director of Operational Test and Evaluation (DOT&E)
DODD	5200.1	DOD Information Security Program
DODI	5000.2	Operation of the Defense Acquisition System
DODI	5134.17	Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(T&E))
DODI	5200.40	DOD Information Technology Security Certification and Accreditation Process (DITSCAP)
DODI	5230.24	Distribution Statements on Technical Documents
DODI	8500.01	Cybersecurity

Table 3. List of DOD, CJCS Directives and Instructions Governing T&E

DOT&E prescribes DOD OT&E and Live Fire T&E policy. The Director's reports, by statute, go directly to the Secretary of Defense and Congress. DOT&E current initiatives include field new capability rapidly; engage early to improve requirements; integrate developmental, live fire, and operational testing; and substantially improve suitability before Initial Operational Test & Evaluation (IOT&E). DOT&E is also emphasizing T&E of Information Assurance (cyber-security) in Acquisition Programs. All DOT&E policies can be retrieved from the Director of Operational Test & Evaluation website: http://www.dote.osd.mil/Policy.html and are shown in Table 4.

Date	Subject
2013	T&E of Information Assurance in Acquisition Programs
2012	Changes to Approved Operational Test Plans
	Independent OT&E Suitability Assessments
2011	Timeliness of OT&E Plans
2010	Clarification of Procedures for OT&E of Information Assurance in Acquisition Programs
	Guidance on the use of DOE in OT&E
	Use of Production-Representative Test Articles for IOT&E
	Designation of Programs for OSD Operational & LFT&E Oversight
	Guidelines for OT&E of Information & Business Systems
	Timely Provision of Test Data
	Standardization of Hard Body Armor Testing
	Timely Analysis & Reporting of T&E Results
	Reporting of OT&E Results
2009	T&E Initiatives
	Modification of Systems Subject to Survivability Testing Oversight
	Using DOE for OT&E
	Procedures for OT&E of Information Assurance in Acquisition Programs
2008	Definition of Integrated Testing
2007	T&E Policy Revisions
2005	MOA on Operational Suitability Terminology & Definitions to be used in OT&E
2002	Modeling and Simulation
2000	Policy on the Use of Test Data in Operational Evaluations
	MOA on MOT&E & JT&E
1999	Policy on OT&E of Electromagnetic Environmental Effects & Spectrum Management
1994	Software Maturity Criteria for Dedicated OT&E of Software-Intensive Systems

Table 4. DOT&E Policy (from the Director of Operational Test & Evaluation website)

(2) DASD(DT&E) Policy

DASD(DT&E) prescribes policy and guidance in support of the acquisition of major DOD weapon systems and to provide advocacy, oversight, and guidance to elements of the acquisition workforce responsible for DT&E per DODI 5134.17 dated 25 October 2011. The policy focused to improve the measurable performance criteria and associated metrics used to gain insight into DT&E performance; improve the training, education, and prestige of the DAWIA T&E acquisition workforce; develop policy and guidance to implement recent statutory language; promote the increased use of scientific

and statistical T&E methodologies and tools within the acquisition programs; and develop DT&E methods for capabilities operating in the cyber domain.

In FY13, “Shift Left” was a major DASD(DT&E) initiative. “Shift Left” focuses on earlier DT&E activities to identify and fix problems during development when fixes are more effective, more efficient and less costly. The initiative has three key focus areas: earlier mission context, earlier operability testing and earlier cyber security testing (Hutchinson, 2013).

DASD(T&E) is the T&E functional leader and is designated by the Under Secretary of Defense for Acquisition, Technology and Logistics to improve the professional qualification standards for T&E workforce. In coordination with Defense Acquisition University (DAU), DASD(T&E) is developing more rigorous qualification standards and documentation procedures to track an individual’s demonstrated T&E knowledge, skills and experience (Office of the Deputy Assistant Secretary of Defense for Developmental Test & Evaluation, n.d.).

In order to improve test effectiveness and ensure efficient use of scarce resources, DASD(T&E) in collaboration with the Commander Air Education and Training Command, established the Scientific Test and Analysis Techniques (STAT) Center of Excellence (COE). The COE directs the use of scientific and statistical methods in developing rigorous test plans and the evaluation of results. Design of Experiments (DoE) is one of the tools and techniques utilized for STAT. DoE is a structured process to identify metrics, factors and levels that mostly affect effectiveness and suitability (Air Force Institute of Technology, n.d.).

(3) HQDA Policy

As previously discussed, DUSA-TE has the mission to establish policy and is the proponent for Army T&E regulations. HQDA T&E Policy is shown in Table 5; Army T&E Regulations are shown in Table 6.

Proponent	Policy	Year
ASA(ALT)	Use of Contractor Test Data as an Element of Integrated Test and Evaluation	2012
ASA(ALT)	Improving the Reliability of U.S. Army Materiel Systems	2011
DUSA(OR)	TEMP Approval Process Improvements	2004
DUSA-TE	TEMP Policy on Independent Operational Test & Evaluation Suitability Assessments and Evaluations	2012
DUSA-TE	Funding to Assess the Adequacy of Technical Data for Use in Evaluation	2012
DUSA-TE	Documenting Revised T&E Strategies in TEMPs	2011
DUSA-TE	Efficient Use of DOD Test Infrastructure	2010
DUSA-TE	Army Test Synchronization	2010
DUSA-TE	T&E Policy for CBDP Systems	2007
TEMA	Improving HQDA TEMP Approval Process	2008
HQDA	Army Guidelines - Modeling & Simulation in Support of T&E	2000

Table 5. HQDA Policy

(4) Army Policy

Regulation		Title
10–87		Commands, Army Service Component Commands, and Direct Reporting Units
25–1		Army Information Technology
350–50		Combat Training Center Program
385–10		The Army Safety Program
40–10		Health Hazard Assessment Program in Support of the Army Acquisition Process
525–22		U.S. Army Electronic Warfare
700–127		Integrated Logistics Support
700–142		Type Classification, Materiel Release, Fielding and Transfer
70–1		Army Acquisition Policy
70–75		Survivability of Army Personnel and Materiel
71–9		Warfighting Capabilities Determination
73–1		Test and Evaluation Policy
750–10		Army Modification Program
750–43		Army Test, Measurement, and Diagnostic Equipment

Table 6. Army Regulation Directing T&E

The Army Test and Evaluation Command (ATEC) is designated as the Army's independent operational test activity by regulation, not statute. Army Regulation 73–1 Army Test and Evaluation Policy states "USATEC is the Army's independent operational test activity and reports directly to the Vice Chief of Staff, U.S. Army

through the Director of the Army Staff." By means of the U.S. Army Evaluation Center—

1. Perform the duties of a system evaluator for all Army systems except for the systems assigned for evaluation to USAMEDCOM, USAINSCOM, and the commercial items assigned to USACE.

2. Conduct continuous evaluation (CE) on all assigned systems.

3. Develop and promulgate evaluation capabilities and methodologies.

4. Coordinate system evaluation resources through the TSARC. (See chap 9.)

5. Preview programmed system evaluation requirements for possible use of M&S to enhance evaluation and reduce costs.

6. Perform MANPRINT assessments in coordination with Deputy Chief of Staff, G–1 (ARL–HRED).

7. Perform the ILS program surveillance for Army systems. Perform independent logistics supportability assessments and report them to the Army Logistician and other interested members of the acquisition community. Oversee and evaluate the logistics aspects of system acquisition and modification programs and deployed systems to ensure supportability.

8. Participate in program reviews, supportability WIPTs, T&E WIPTs, and other working and review groups and in the development of requests for proposal, statements of work, and contract data requirements lists.

With the merger of the U.S. Army Developmental Test Command, AEC is also directed to provide testers with a safety release for systems before the start of pretest training for tests that use soldiers as test participants; and provide safety confirmations for MS decision review and the materiel release decision.

(5) ATEC T&E Policy

ATEC T&E Policy is shown in Table 7.

Number	Title
REG 73–1	System Test and Evaluation Policy
PAM 73–1	Volume I, System Test & Evaluation Procedures
PAM 73–1	Volume II, Developing, Classifying, and Reporting Test and Evaluation Documents
PB 2–11	Organizational Conflicts of Interest (OCI) Involving Contractors in Support of ATEC Test and Evaluation (T&E)

Table 7. ATEC T&E Policy

ATEC Regulation 73–1 is the primary policy for test and evaluation (T&E) of Army materiel and information technology systems. ATEC exercises overall management of assigned T&E programs. This regulation addresses guidance for developmental testing (DT), operational testing (OT), integrated testing, and system evaluation. Department of the Army (DA) officials use ATEC products (plans and reports) described in this regulation as input to acquisition decisions.

ATEC Pamphlet 73–1 Volume I implements ATEC methodology for testing and system evaluation in accordance with ATEC Regulation 73–1; provides background information on integrated T&E strategies; and provides guidance and suggestions for preparing and formatting documentation for tests, evaluations, and assessments

ATEC Pamphlet 73–1 Volume II is a guide to be used in conjunction with applicable regulatory guidance and Volume I of the ATEC Pamphlet 73–1, System Test and Evaluation Procedures to ensure ATEC documents and the handling of those documents reflect the excellent reputation and credibility of ATEC's expertise and is formal, logically organized, based on independent analysis, relevant in their findings, results, recommendations and conclusions, properly marked, safeguarded from unauthorized persons, and released by the appropriate approval authority to authorized persons only.

ATEC Policy Bulletin 2–11, Organizational Conflicts of Interest (OCI) Involving Contractors in Support of ATEC Test and Evaluation (T&E) dated 19 April 2011

establishes policy to ensure that contracts awarded in support of ATEC are free of actual or potential OCI and states that contractors may work on Army system development programs to the exclusion of participating in ATEC test and evaluation support contracts. Alternatively, they may participate in ATEC test and evaluation support contracts to the exclusion of working on Army system development programs. This is the only reliable and effective means of avoiding violations of Title 10, United States Code, Section 2399(d). With respect to ATEC test and evaluation service support contracts, contracts will not be awarded for operational or developmental test and evaluation support to prime contractors or affiliates that are executing Army developmental programs. This is because test and evaluation support contractors may be required to evaluate the products and services of developers, their subcontractors and suppliers.

(6) Civilian Personnel Management Mandates

Personnel management is based on and embodies the Merit System Principles (the merit system principles in 5 United States Code 2301(b). The merit system principles are the public's expectations of a system that is efficient, effective, fair, open to all, free from political interference, and staffed by honest, competent, and dedicated employees.

The merit system principles are:

- Recruit qualified individuals from all segments of society and select and advance employees on the basis of merit after fair and open competition which assures that all receive equal opportunity.
- Treat employees and applicants fairly and equitably, without regard to political affiliation, race, color, religion, national origin sex, marital status, age, or handicapping condition, and with proper regard for their privacy and constitutional rights.
- Provide equal pay for equal work and recognize excellent performance.
- Maintain high standards of integrity, conduct, and concern for the public interest.
- Manage employees efficiently and effectively.
- Retain and separate employees on the basis of their performance.
- Educate and train employees when it will result in better organizational or individual performance.

- Protect employees from arbitrary action, personal favoritism, or coercion for partisan political purposes.

(7) ATEC HQ Mandates

AEC is under the Acquisition Demo which provides significant flexibilities to set pay and increase salaries based on performance. However, long-term affordability is a concern. To ensure fiscal responsibility, consistency throughout ATEC, and adherence to the merit principle of equal pay for equal work, ATEC HQ established control points for every position and used to set pay and manage salary progression.

Per ATEC Memorandum, 20 Dec 2011 subject: Command Civilian Acquisition Workforce Personnel Demonstration Project (AcqDemo) Control Point Policy, the FY13 control points for AEC are shown in Table 8.

Acq Demo Rating Group	Band	Control Point (Base Salary)	Notes
Director	NH-04	129,517	Top of Band
Technical Director	NH-04	129,517	Top of Band
Division Chief	NH-04	119,554	
Technical 04	NH-04	110,737	
Technical 03	NH-03	93,175	Top of Band
Technical Editor	NH-03	78,733	
Technical Editor	NH-02	65,371	Top of Band
Technical Editor	NK-02	44,176	Top of Band
Program Specialist	NH-03	78,733	Supports Directorate
Program Specialist	NH-03	74,354	Supports Division
Executive Assistant	NH-02	60,795	Supports AEC Director
Admin Specialist	NH-02	54,911	Supports Tech Director/ Military Deputy
Secretary	NK-03	49,681	
Secretary	NK-02	44,176	Top of Band

Table 8. AEC Control Points (from Dellarocco, 2011)

In 2011, Commanding General, ATEC through vocal command, directed that requirements for ATEC System Team Chairs, who are responsible for the design of experiments and integrated evaluation, to complete Lean Six Sigma Black Belt certification.

Commanding General, ATEC directed execution of the ATEC Paperless Office Program (APOP). The APOP is a phased approach where the first week required employees to determine if they really needed to print the document. During the second week, all network printers were taken off-line. During the third week, local printers were taken off-line. During FY13, APOP executed twice.

B. THROUGHPUTS

1. Tasks

A throughput component is the tasks of the organization. These are the actual basic tasks, jobs, or functions performed by the organization. This factor includes how they are formalized, how they vary, and what specification is required.

DOD Dictionary defines essential task as "A specified or implied task that an organization must perform to accomplish the mission that is typically included in the mission statement." AEC's mission statement as documented on the AEC web-site is: "To plan, support, conduct and provide independent evaluations, assessments, and experiments in order to provide essential information to decision-makers." (AEC, 2013)

Tasks are governed by ATEC Regulation 73–1 and ATEC Pamphlet 73–1. The AEC tasks include: Key steps in the traditional ATEC T&E process include:

a. Conduct the Early Strategy Review to discuss and approve the Evaluation Strategy

b. Develop inputs to the Test and Evaluation Master Plan (TEMP)

c. Document the evaluation strategy in the System Evaluation Plan (SEP)

d. Assess the program's risks and projecting the program's Effectiveness, Suitability and Survivability capabilities and limitations in the OTA Milestone Assessment Reports (OMARs).

e. Conduct Rock Drills to ensure supporting plans are synchronized and resources are available

f. Develop OT Test Plans (OT TPs) that detail each data gathering event

g. Document the system's Effectiveness, Suitability and Survivability capabilities and limitation in OTA Evaluation Reports (OERs)

h. Prepare safety confirmations and safety releases.

There is not variation in the tasks, however, the products produced to support the task may be tailored. The only metric supporting these tasks are timeliness based on the internal milestones captured in the ATEC Decision Support System.

2. Technology

The technology factor in the throughput process refers to the workflow in an organization and how it can be described. It includes the activities in the workflow, any interdependencies among the work units or activities involved in the work flow, and the condition of the physical facilities and equipment used by the organization.

a. Workflow

The purpose of the ATEC T&E Process as defined in ATEC Regulation 73–1 and ATEC Pamphlet 73–1 is to provide essential information to decision makers through planning, conducting, and integrating developmental testing, independent operational testing, independent evaluation, assessments and experiments. Figure 8 shows the AEC workflow.

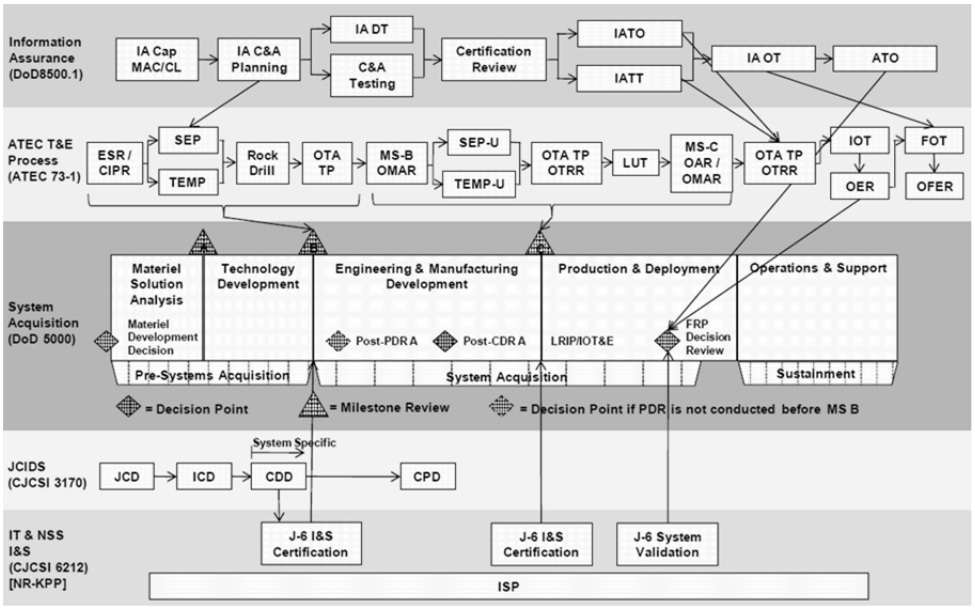


Figure 8. Interrelated Processes of DOD Acquisition and ATEC T&E Process (from Army Test and Evaluation Command, 2013, p. 24).

The purpose of the ATEC T&E Process is to provide essential information to decision makers through planning, conducting, and integrating developmental testing, independent operational testing, independent evaluation, assessments and experiments. Figures 9 through 12 depict the key activities with inputs and outputs for each phase of the acquisition cycle.

	Inputs	Key Activities	Outputs
MSA	▪ Joint Capabilities Document (JCD) ▪ Initial Capabilities Document (ICD) ▪ Universal Joint Task List (UJTL) and Army Universal Task List (AUTL)	▪ Form an AST ▪ For non-major programs (ACAT III) and those not on the DOD-oversight list, determine the level of evaluation. ▪ Conduct mission analysis by considering operational capabilities of the system and environmental/threat challenges ▪ Develop concept performance objectives with the T&E Working Integrated Product Team (WIPT) ▪ Develop T&E strategy	▪ ***T&E Strategy*** ▪ ***AST Charter***

Figure 9. Evaluation Activities during Materiel Solution Analysis (MSA) Phase (from Army Test and Evaluation Command, 2013, p. 64)

	Inputs	Key Activities	Outputs
TD	▪ UJTL and AUTL ▪ ICD ▪ Draft CDD ▪ Operational Mode Summary/Mission Profile (OMS/MP) Draft Critical Operational Issues and Criteria (COIC) ▪ Security Classification Guide (SCG)	▪ Review COIC ▪ Develop MOP and MOE in context of a Pattern of Analysis (POA) ▪ Develop DM ▪ Develop experiment design ▪ Coordinate with developmental and operational testers, CBTDEV, and MATDEV ▪ Consider use of M&S ▪ Develop Data Source Matrix (DSM) ▪ Conduct Early Strategy Review (ESR) and/or Concept In Process Review (CIPR) ▪ Develop SEP ▪ Contribute to TEMP ▪ Coordinate and oversee DT ▪ Develop MS B OMAR ▪ Conduct rock drills ▪ Contribute to the development of the TRP	▪ Approved COIC ▪ Draft TEMP ▪ **Test and simulation execution strategy** ▪ **SEP** ▪ **MS B OMAR** ▪ Test Resource Plan (TRP)

Figure 10. Evaluation Activities during Technology Development (TD) Phase (from Army Test and Evaluation Command, 2013, p. 65)

	Inputs	Key Activities	Outputs
E&MD	▪ UJTL and AUTL ▪ CDD ▪ COIC ▪ OMS/MP ▪ TEMP ▪ SEP ▪ APB ▪ System specifications ▪ Draft ISP ▪ TRP ▪ Logistics Manpower and Personnel Integration Demonstration (LMD) plan ▪ Military utility assessments or demonstrations of final reports ▪ SCG	▪ Update the SEP ▪ Update the TEMP ▪ Develop an M&S accreditation plan; conduct M&S Verification and Validation (V&V) as required; and prepare M&S V&V and accreditation reports ▪ Coordinate with testers on the OTA TP ▪ Coordinate/oversee the DT ▪ Conduct a Limited User Test (LUT) ▪ Conduct LMD ▪ Conduct OTRR ▪ Conduct OT ▪ Develop MS C OMAR ▪ Prepare an OAR in support of LRIP for ACAT I, II or oversight systems	▪ TEMP ▪ **Updated SEP** ▪ OTA TP ▪ **Accredited M&S** ▪ **MS C System Evaluation Report (SER)** ▪ DT event level Test Report (TR) ▪ LMD report

Figure 11. Evaluation Activities during Engineering and Manufacturing Development (E&MD) Phase (from Army Test and Evaluation Command, 2013, p. 66)

	Inputs	Key Activities	Outputs
P&D	▪ UJTL and AUTL ▪ CDD ▪ CPD ▪ COIC ▪ OMS/MP ▪ TEMP ▪ SEP ▪ APB ▪ System specifications ▪ ISP ▪ Military utility assessments or demonstration final reports ▪ SCG ▪ TRP ▪ OTA TP	▪ Update the SEP ▪ Update the TEMP ▪ Verify and validate M&S as required ▪ Coordinate with testers on OTA TP ▪ Prepare T&E materials for OTRR ▪ Coordinate/conduct OT ▪ Develop OTA Evaluation Report (OER) in support of FRP Decision Review (DR)	▪ Updated TEMP ▪ ***Updated SEP*** ▪ Validated M&S ▪ OTA TP ▪ OT reports ▪ ***FRP decision review OER***

Figure 12. Evaluation Activities during Production and Deployment (P&D) Phase (from Army Test and Evaluation Command, 2013, p. 66)

b. Tasking Process

AEC directorate structure is discussed in later in the document. ATEC HQ Directorates, as the servicing staff, task AEC directorates without going through an operations cell. Up to eleven (11) separate mission analyses (one per AEC directorate) are completed to determine if task should be executed by AEC. Figure 13 shows the complexity of the AEC tasking process.

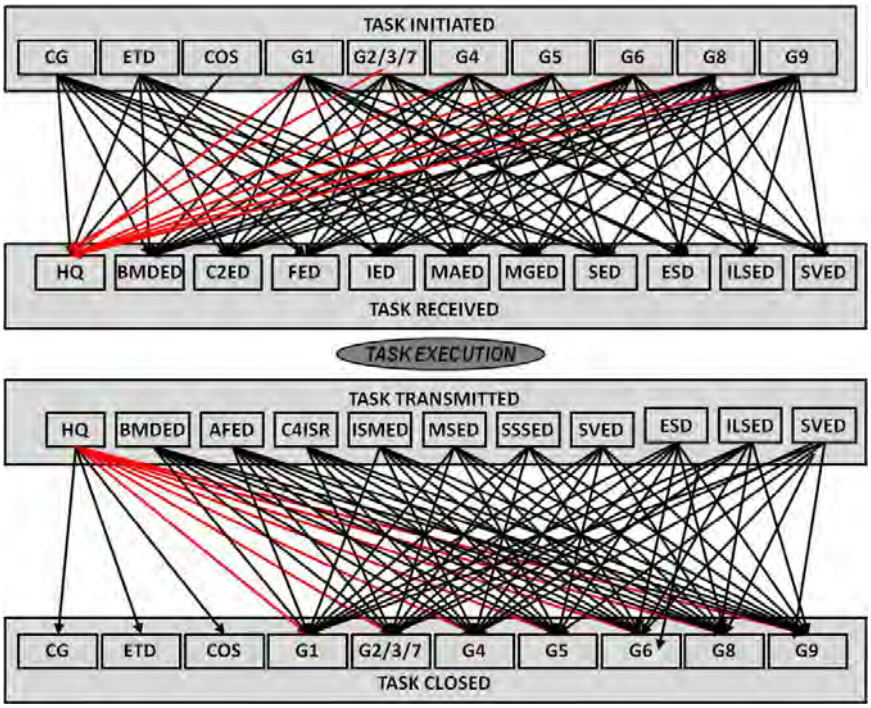


Figure 13. AEC Tasking Process

c. Facilities

As a result of BRAC 2005, ATEC headquarters and the U.S. Army Evaluation Center located in Alexandria, Virginia, were directed to relocate to Aberdeen Proving Ground (APG) and to consolidate with elements of the command already stationed there by Sept. 15, 2011. ATEC and AEC headquarters staff was consolidated within a new headquarters building (B2202); however the new building could not accommodate all

AEC employees. This resulted in a “geographically dispersed” AEC with three directorates (SVED, ILS & ESD) stationed in renovated “rolling pin” barracks; IED in a former Future Combat System building and SED stationed in stationed in temporary space (relocatable buildings) after the former DTC HQ building was condemned due to black mold. BMDED, serving as the BMDS OTA, is located with their customer at Redstone Arsenal, Alabama. Figure 14 shows the placement of the AEC APG directorates and was derived from Google Maps.

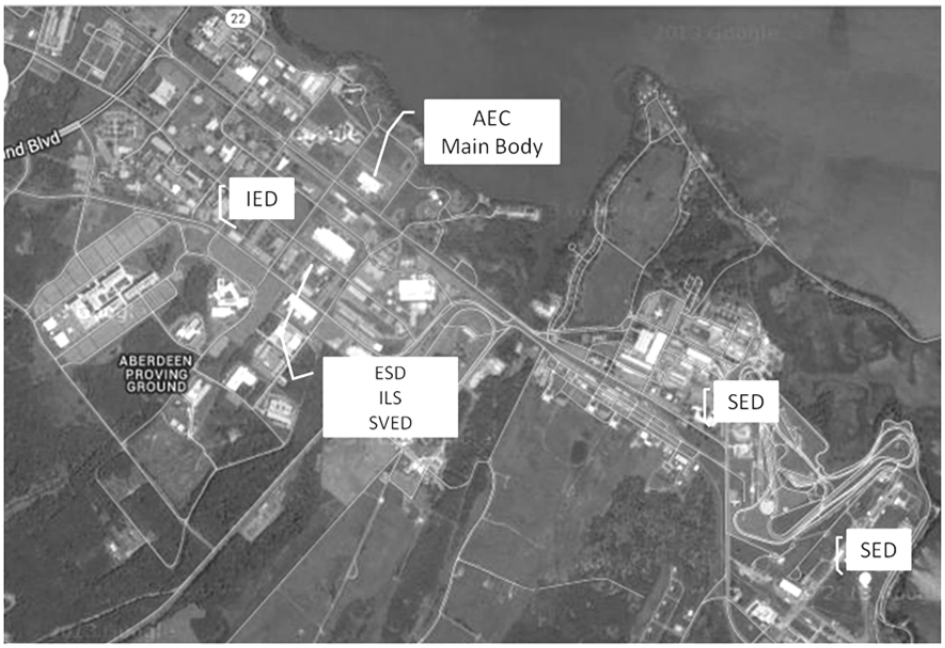


Figure 14. AEC Locations (APG)

B2202 is a newly constructed building that includes 141,453 gross square feet of administrative, meeting and training space on three levels. The building incorporates several specialized features to include Anti-terrorism Force Protection, a work-out room, central conference and training areas. B2202 is LEED®-Gold certified; LEED®-Gold is a green building certification program that recognizes best-in-class building strategies and practices (Foulger-Pratt, 2009). Figure 15 shows the new ATEC HQ building.

Figure 15. ATEC HQ B2202

AEC management (Directors, Technical Directors and Division Chiefs) are assigned private offices. The employee workspace is configured using cubicles. B2200 has two sizes of cubicles 6'X8' and 8'X8' in the "cube farm." Each cubicle has side panels that are 57" in height and has limited storage. There is a "mobile pedestal file with cushion top" which serves as storage and guest seating. There is a storage tower that provides lockable file drawers and a wardrobe for coat storage. A bookcase is also provided that has a lockable drawer.

Many cubicles are adjacent to the main hallways and common area break rooms. Lack of privacy and noise are the two of the biggest complaints regarding the cubicles as the 57" side panels do not shield hallway conversations according to co-workers (personal communications, November 12, 2013).

The AEC HQ Office of the Director is known as the "Fortress" (personal communication with co-workers, various). Due to anti-terrorism/force protection procedures, there is controlled access to the suite of offices. A visitor control officer is stationed within the reception area and ensures that visitors are escorted back to the offices in a deliberate manner.

AEC Director's policy letter #1 focuses on the Open Door Policy. The intention of the Open Door policy is to assist conflict resolution within the center. The guidance in the letter states that the issue needs to come up through the chain of command. Unfortunately, the AEC workforce interprets "open door" policy as a "walk-in at any time."

d. Equipment

B2202 is equipped with the latest approved equipment to include multifunctional products compose of copier, scanner, printer and facsimile with the added capability of network-based document capture, storage and distribution. This equipment is accessed by logging in with a Common Access Card (CAC). The all-in-one functionality requires network availability.

AEC employees are equipped with laptop with docking station and additional monitor. This set-up allows employees to take their computers with them while supporting and witnessing tests.

Information technology systems are addressed in the Processes section of the paper.

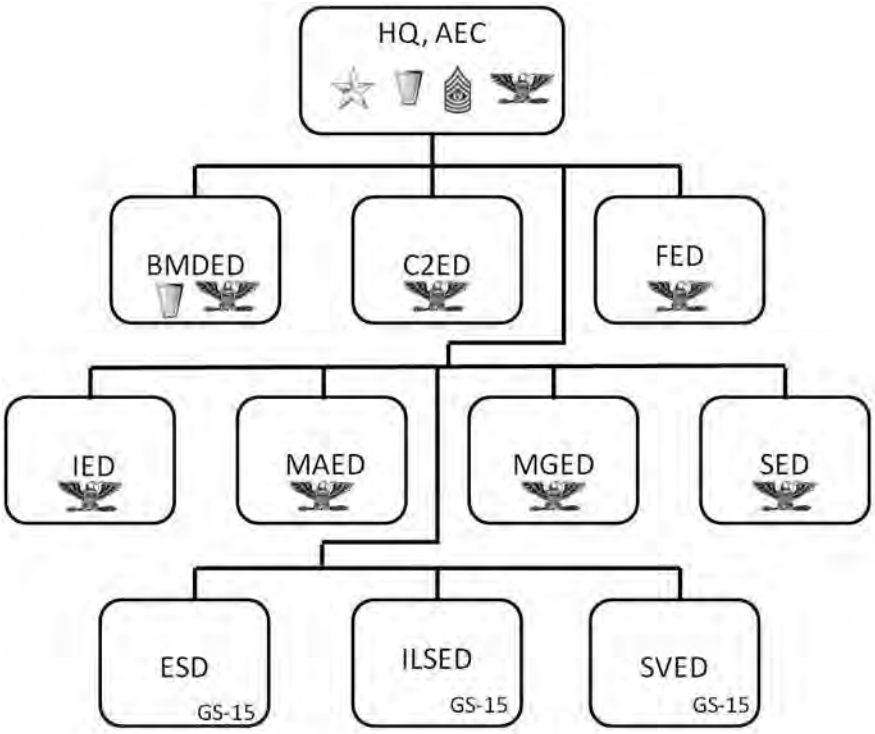
3. Structure

In the OSF model, structure refers to basic groupings of activities and people, how the activities are combined or departmentalized, and how groupings are integrated. Also considered, are the integrating devices used such as hierarchy, task forces, matrix or network type of arrangements.

AEC is an organized U.S. Army activity, comprised of an Army table of distribution and allowances (TDA) unit reporting directly to the Commanding General (CG), U.S. Army Test and Evaluation Command (ATEC). As a result of BRAC 2005, Headquarters U.S. Army Test and Evaluation Command (ATEC), U.S. Army Developmental Test Command (DTC), and U.S. Army Evaluation Center (AEC) reorganized and consolidated in accordance with the 2005 Base Realignment and Closure Law, HAS-JCSG-D-05–36: “Realign Park Center Four, a leased installation in Alexandria, VA, by relocating and consolidating Army Test and Evaluation Command (ATEC) with its subcomponents at Aberdeen Proving Ground (APG), MD.” The three (3) headquarters staff consolidated into one HQ ATEC with a G-Staff structure and established staff matrix support to AEC. DTC was disestablished and the test management function and resources were split between HQ ATEC G-9 and AEC directorates. HQ ATEC staff analyzes, assesses, provides staff-management oversight

and recommends for decision all activities affecting policy, guidance, developmental processes and implementation/execution processes to support the center in meeting its mission.

The AEC organizational structure is shown at Figure 16. AEC is comprised of a headquarters and ten subordinate directorates. The Director of AEC is a one star General Officer (GO) billet with a civilian Executive Director (Senior Executive Service (SES).



BMDED – Ballistic Missile Defense Evaluation Directorate
C2ED – Command and Control Evaluation Directorate
FED – Fires Evaluation Directorate
IED – Intelligence Evaluation Directorate
MAED – Maneuver Air Evaluation Directorate
MGED – Maneuver Ground Evaluation Directorate
SED – Sustainment Evaluation Directorate
ESD – Evaluation Sciences Directorate
ILSED – Integrated Logistics Support Evaluation Directorate
SVED – Survivability Evaluation Directorate

Figure 16. AEC Organizational Structure (from Army Evaluation Center, 2011)

AEC directorates are aligned to the Army's Warfighter Functions (WFF) and the core themes of effectiveness, suitability and survivability. Given the size and the scope of the Maneuver WFF, AEC organized around two maneuver directorates (air and ground). The technical analytical functions of evaluation sciences (RAM, statistical analysis and modeling and simulation), integrated logistics support and survivability manage and apportion workload effort in a matrix-support arrangement.

- Ballistic Missile Defense Evaluation Directorate (BMDED)–Army operational test and evaluation arm of the Ballistic Missile Defense System (BMDS), and lead service member of the BMDS Operational Test Agency Team.
- Command and Control Evaluation Directorate (C2ED)–Army and joint command, control, and communications, business information and medical information systems.
- Fires Evaluation Directorate (FED)–Fire Support and Air and Missile Defense systems (rockets and missiles, cannons, command and control)
- Intelligence Evaluation Directorate (IED)–Intelligence-related acquisition programs, surveillance and reconnaissance, electronic and information warfare covering national, theater, coalition and commercial space.
- Maneuver Air Evaluation Directorate (MAED)–Aviation systems to include aircraft, air traffic control, munitions and air Soldier support systems
- Maneuver Ground Evaluation Directorate (MGED)–Infantry/Soldier systems, wheeled and tracked combat platforms, sensors and target acquisition systems, battle command systems, combat training simulators and lethal and non-lethal weapons/munitions programs.
- Sustainment Evaluation Directorate (SED) –Sustainment, mobility, maneuver support, quartermaster, ordnance, transportation, military police, engineer and chemical-biological systems.
- Evaluation Sciences Directorate (ESD) - Reliability, Availability and Maintainability (RAM) system characteristics for major defense acquisition programs; statistical analysis, Design of Experiments (DOE) and modeling and simulation (M&S) support; co-lead with the Army Materiel Systems Analysis Activity (AMSAA) for the Army's Center for Reliability Growth (CRG).
- Integrated Logistics Support (ILS) Directorate–Logistics supportability (to include MANPRINT) evaluation of a system and its impact on suitability, and independent logistics supportability assessments.

- Survivability Evaluation Directorate (SVED)–Survivability, ballistic and non-ballistic battlefield threats, live-fire evaluations and reports, and vulnerability and lethality of Army and designated joint systems. Also leads ATEC's Information Assurance Task Force for the Combatant Commanders (COCOM).

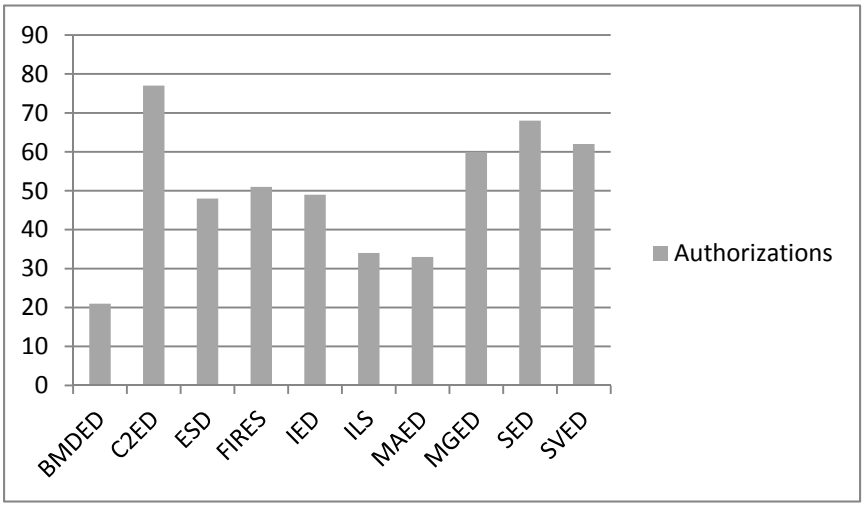


Table 9. Number of Authorizations by Directorate per TDA FY13

Table 9 shows the number of authorizations per directorate as defined in the FY13 TDA. AEC allocates authorizations based on workload. Table 10 shows the number of systems/programs supported by ACAT for each directorate as documented in the ATEC Decision Support System.

	Acquisition Category (ACAT)							
Directorate	ID	IAC	IAM	IC	II	III	NA	TOTAL
BMDED	4					3	2	9
C2ED	21	5	18	2	7	29	76	158
FED	7		3	11	19	30	31	101
IED	4		9	1	8	24	56	102
MAED	10			12	14	29	51	116
MGED	17		4	39	25	85	96	266
SED	16		1	10	25	173	252	477

Table 10. Number of Systems/Programs Supported by ACAT for Each Directorate.

AEC directorates are organized similarly with the program specialist and lead secretary reporting to the Director and the junior secretary, technical editor (optional) and technical divisions reporting to the Technical Director. Directorate structure is shown in Figure 17.

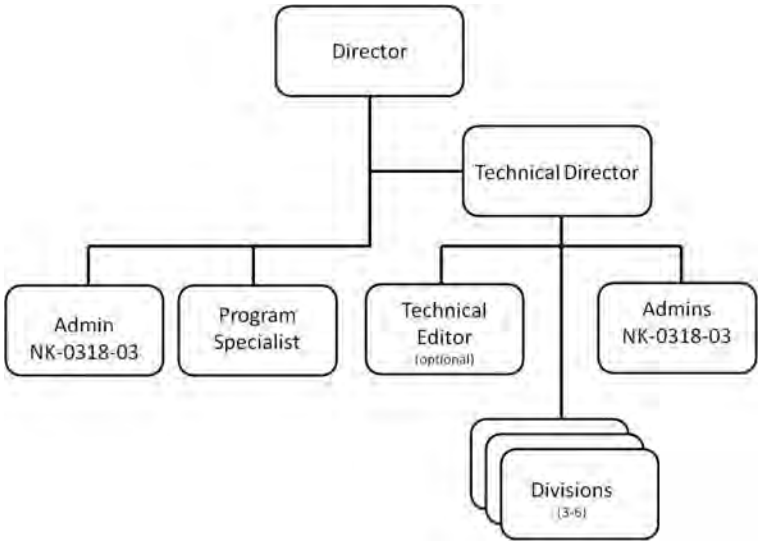


Figure 17. AEC Directorate Structure

AEC is structured with 46 divisions distributed among the 10 directorates. The number of divisions per directorate are a minimum of 3 (BMDED, FED, IED, ILS) to maximum of 6 (C2ED and SVED). Table 11 shows the distribution of authorizations among the AEC divisions.

Directorate	Division	Auth
BMDED	EPD DIV 1	6
	EPD DIV 2	6
	I/A DIV	9
C2ED	BUS INFO TECH DIV	14
	INTEGRATION DIV	13
	MED INFO TECH DIV	8
	MISSION CMD DIV	12
	NETWORKS DIV	24
	TEST MGT DIV	6
ESD	AV, MSL & C21 DIV	13
	COMBAT SPT DIV	12
	GRD CBT FIRE SPT DIV	14
	MISSION SPT DIV	6
	STATISTICS/DOE DIV	3
FIRES	ADA DIV	20
	FA DIV	20
	TEST AND SAFETY DIV	11
IED	AISR DIV	9
	ECM DIV	12
	GISR DIV	9
	INTEL&INFO WARFARE	3
	OPS & MIL EVAL DIV	8
	TEST PLAN DIV	8
ILS	AIR DIV	11
	FORCE PROTECT DIV	11
	GROUND DIV	12
MAED	AH&TI DIV	8
	MANNED/UNMANNED SYS	9
	SCOUT UTIL & SPT SYS	10
	TEST MGT/SYS SAFE DIV	6
MGED	ADV CONCEPTS DIV	13
	INFANTRY DIV	13
	MTD MANEUVER SYS DIV	13
	MUNITIONS DIV	7
	TEST DIV	14
SED	CHEM BIO DEF DIV	11
	DEVELOP TEST DIV	15
	FORCE SPT DIV	15
	MANEUVER SPT DIV	13
	TACTICAL MOB DIV	14
SVED	BALLIST AIR DIV	7
	BALLIST GRD DIV	11
	COCOM DIV	16
	MILITARY DIV	3
	NON-BALLISTIC AIR DIV	15
	NON-BALLISTIC GRD DIV	10

Table 11. Number of Authorizations by Division by Directorate

Current Department of Defense guidance on supervisory to employee ratio is 1:14 as posted on http://cpol.army.mil/library/permiss/310.html, the United States Army Civilian Personnel website. Thirty-nine out of 46 divisions are under the 1:14 guidance.

4. People

The OSF model design factor, people, describes the number and types of personnel in the organization, including their expectations, motivations, and mindsets, as well as their knowledge, skill sets, and abilities. This data assists in analyzing the organization and any intended or unintended consequences that may occur when inputs are being processed into results.

During FY12, CG ATEC directed commanders and senior leaders to evaluate each and every position and their business processes to ensure only critical vacancies were filled. All civilian hiring actions were frozen until each commander completed their analyses and was approved by CG ATEC. While the analysis was on-going, CG ATEC proposed to reduce ATEC's current civilian authorizations by 220 beginning in FY14. The intent was to reduce civilian strength in anticipation of the Army's manpower reductions and not become a bill-payer in future manpower reductions. AEC's apportionment of the reduction was 32 authorizations. Unfortunately, Army is further reducing ATEC manpower.

AEC's manpower trend is shown in Figure 18. The AEC civilian authorizations are projected to decrease by 20% from FY13 to FY20 as posted on https://fmsweb.army.mil/protected/WebTAADS/Frame_DocTypes.asp, the Army's Force Management System website). Figure 18 shows the AEC growth during the conflict years as well as the reductions in the out-years.

Figure 18. AEC Civilian Manpower Trend FY02-FY18

Military Manpower Trend. AEC military authorizations are also on a downward trend resulting in the lowest number of military authorizations to date. The AEC military authorizations are projected to decrease by 10% from FY13 to FY20 as posted on https://fmsweb.army.mil/protected/WebTAADS/Frame_DocTypes.asp, the Army's Force Management System website) Figure 19 shows the decreasing trend of AEC military authorizations.

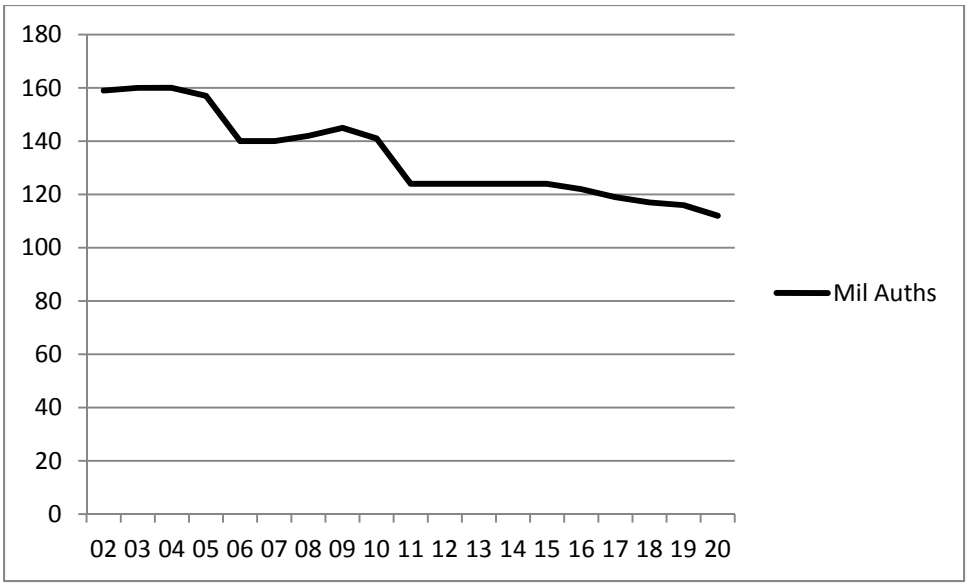


Figure 19. AEC Military Manpower Trend FY02-FY20

Focusing on the FY13 to FY20 timeframe, AEC's total strength (authorizations) are decreasing by 100 personnel or 17%. Table 12 and Figure 20 show the full manpower trend.

Auth	2013	2014	2015	2016	2017	2018	2019	2020
CIV	429	407	407	390	371	352	344	344
MIL	124	124	124	122	119	117	116	112
Total	553	531	531	512	490	469	460	456
From 553 (FY13) to 456 (FY20) = 17% reduction								

Table 12. Total Authorizations FY13-FY20

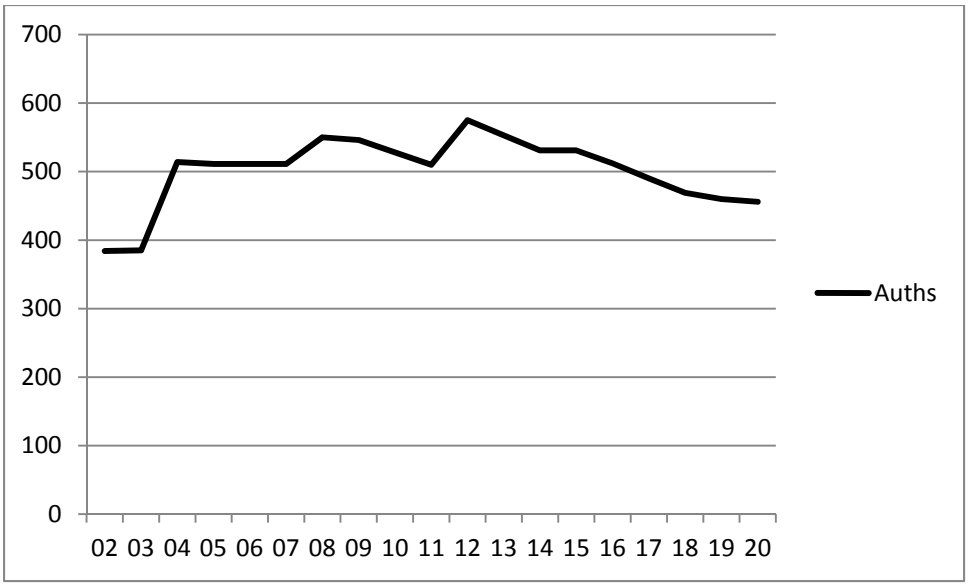


Figure 20. AEC Total Authorization Trend (Military and Civilian)

a. Demographics

Military-Civilian. AEC's total workforce for FY13 is 439 civilian authorizations and 124 military authorizations.

Figure 21. Military-Civilian Authorizations

(1) Military Rank-MOS

AEC military personnel are comprised from several branches of the military shown in Table 13. AEC updates the MOS and rank requirements during the yearly TDA update. The requirements are based on the workload projections of weapon systems

scheduled for evaluation. Manning AEC with Soldiers can very dynamic. The Army assigns officers based on availability. It sometimes takes up to two years to fill a requisition for a high demand MOS.

Branch	BG	O6	O5	O4	O3	O2	W5	W4	W3	W2	E9	E7	E6	Total
Air Defense			2	5	1			1	1			2	1	13
Adjutant General										1		1		2
Armor			1	1	1									3
Aviation		1	1	2	1							3		8
Branch Immateriel		2				1					1			4
Counter Intelligence		1	1		3									5
Chemical			1		1									2
Field Artillery		1	1	4	1	1								8
Finance					1							2		3
General Officer	1													1
Infantry				2	1									3
Logisitics		1	3	2	3							2		11
Military Intelligenve		1	1	2	3							2		9
Medical Services					1									1
Ordnance							1		1					2
Operations Research (FA 49)				4										4
Quartermaster								1						1
Acquisition (FA 51)			9	17	3									29
Signal Corps		1	2	6					1			4		14
Information Sys Engr (FA 24)					1									1
Total	1	8	22	45	21	2	1	2	3	1	1	16	1	124

Table 13. AEC Military–Branch by Rank Totals

(2) Civilian Series-Grade

AEC civilian personnel are comprised from several branches of the military shown in Table 14. AEC updates the MOS and rank requirements during the yearly TDA update. The requirements are based on the workload projections of weapon systems scheduled for evaluation.

Series	Grade				
	SES	02	03	04	Total
00180 - Engineering Psychologist			1		1
00301 - Misc Admin and Program		4	14	1	19
00303 - Misc Clerk and Assistant		1			1
00318 - Secretary		14			14
00343 - Management and Program Analysis			2		2
00344 - Management and Program Clerical Assistant		1			1
00346 - Logistics Management Specialist			8	2	10
00801 - General Engineer	1		40	29	70
00830 - Mechanical Engineer			13	10	23
00850 - Electrical Engineer			1		1
00854 - Computer Engineer			4		4
00855 - Electronics Engineer			28	16	44
00861 - Aerospace Engineer				1	1
01083 - Technical Editor		3	1		4
01087 - Editorial Assistant		1			1
01301 - Physical Scientist	1		1		2
01515 - Operations Research Analyst			120	112	232
01529 - Math-Stat			4	2	6
02210 - IT Specialist			3		3
Total	2	24	240	173	439

Table 14. AEC Civilian by Job Series and Grade

b. Motivations

Herzberg's Motivation-Hygiene Theory separates factors into two distinct categories that can affect employee morale. One set of factors can promote job satisfaction and includes recognition for achievement, advancement, and possibility of occupational growth. Completely different factors are more responsible for job dissatisfaction including how employees are supervised, policies, co-worker relationships working conditions and salary (Hertzberg's Motivation-Hygeine Theory (Two Factor Theory), n.d).

Furloughs, elimination of monetary awards, restrictions on performance pay-outs, a moratorium on overtime/compensatory time and program cancellations such as the Student Loan Repayment Program have led to lower moral. The curtailment of training and development opportunities (cancellation of conferences) has eliminated opportunities for younger employees to present their work to their peers.

AEC uses recognition as a motivator. The goal of the awards program is to foster mission accomplishments by recognizing professional excellence and motivate the workforce to high levels of performance and service. The awards are honorary; monetary awards are linked to the CCAS pay-outs. AEC awards program is discussed later in the paper.

Other motivators include benefits such as telework and flexible/compressed work schedules. Telework is a benefit of federal employment that allows work from home or another convenient location. The Telework Enhancement Act of 2010 resulted in each agency must establish a telework policy, so eligible employees can have the opportunity to utilize this advantage. The Federal Employees Flexible and Compressed Work Schedules Act ("FEFCWA") authorizes alternative work schedules (AWS): flexible work schedules (FWS) and compressed work schedules (CWS). AEC has established core hours when all employees must be at work (0900–1500) and allows employees to choose arrival and departure times around those core hours. Under a CWS, an employee's bi-weekly, 80-hour work requirement is scheduled by the agency for less than 10 days. Most AEC civilian employees take advantage of the CWS by working 9 hour days Monday-Thursday with one 8-hour Friday.

5. Processes/Subsystems

The last factor in the throughputs portion of the OSF model are the essential processes or subsystems in the organization that help manage, control, and run daily operations and plan for effective and efficient long term success. The OSF breaks down the processes into sub-factors of financial management, measurement and controls; human resources management; and communications, information planning and decision-making.

a. Financial Management, Measurement and Controls

The majority of financial management for AEC is handled by its higher headquarters.

(2) Resource Accountability

Program Budget Advisory Committee (PBAC). The purpose of the PBAC is to provide recommendations to the AEC Director on the administration and management of AEC financial and manpower resources. Currently, the PBAC schedule is not time-based but event-based. Members include the AEC Military Deputy and AEC Directors. ATEC HQ G-8 Director of Resource Management provides the information to the attendees.

(3) Budgeting

The majority of financial management for AEC is handled by its higher headquarters. Theoretically, the budget is based on the number of authorized positions in the TDA along with a certain amount per person for basic supplies, training and travel needs. ATEC G-8 uses the estimate of $149K for civilians (includes salary and benefits paid for by AEC). AEC is not resourced for 439 civilians. There is disconnect between the manpower authorized and the budget allocated for civilian salaries causing confusion in out-year workforce planning.

(4) Control

Management Internal Control Program. The Accounting and Auditing Procedures Act of 1950, as amended by the Federal Managers' Financial Integrity Act (FMFIA) of 1982, P.L. 97–255 (codified at Title 31, United States Code, Section 3512 (31 USC 3512)) established the requirement for Government agencies to institute and maintain adequate systems of internal control . Office of Management and Budget (OMB) Circular A–123, and within DOD by DODI 5010.40 implements the statute. Internal controls are defined as "The rules, procedures, techniques, and devices employed by managers to ensure that what should occur in their daily operations does occur on a continuing basis. Internal controls include such things as the organizational structure itself (designating specific responsibilities and accountability), formally defined procedures (for example, required certifications and reconciliations), checks and balances (for example, separation of duties), recurring reports and management reviews, supervisory monitoring, physical devices (for example, locks and fences), and a broad array of measures used by managers to provide reasonable assurance that their subordinates are performing as intended" (U.S.

Army, 2012). AEC provides a self-assessment using the checklists provided in the DOD policies, Army Regulations and local policies to assess if AEC is compliant with the guidance. ATEC HQ includes AEC in their annual assessment for the functions provided by the staff.

Monthly Resource and Analysis (R&A) Meetings. R&A meetings are scheduled once a month with the Commanding General, ATEC. The purpose of the R&A is to provide staff updates and review the command metrics. A separate R&A to the AEC Director is not offered.

(5) Performance Measurement

a. Civilian Appraisal System

The National Defense Authorization Act (NDAA) for Fiscal Year (FY) 1996, as amended by section 845 of the NDAA for FY 1998, allowed the Department of Defense (DOD), with approval of the Office of Personnel Management (OPM), to conduct a personnel demonstration project with its civilian acquisition workforce. The DOD Civilian Acquisition Workforce Personnel Demonstration Project (AcqDemo) was implemented on February 7, 1999, in accordance with the Federal Register notice (64 FR 1426), January 8, 1999. AcqDemo was an opportunity to re-engineer the civilian personnel system to meet the needs of the Acquisition, Technology, and Logistics (AT&L) Workforce and to facilitate the fulfillment of the DOD acquisition mission.

The purpose of AcqDemo was to demonstrate that the effectiveness of the AT&L Workforce could be further enhanced by allowing greater direct managerial control over personnel functions and, at the same time, expanding the opportunities available to employees through a more responsive and flexible personnel system. It was designed to provide managers the authority, control, and flexibility needed to better manage the AT&L Workforce, with the immediate goal of enhancing the quality and professionalism of that workforce, and the ultimate goal of providing the best acquisition systems for the DOD.

The AcqDemo Project implemented civilian personnel system changes, or interventions, designed to overcome the limitations of the existing Title 5 personnel system. Together, the AcqDemo interventions:

- Delegated and streamlined position classification and assignment processes;
- Gave managers a wider range of applicants and the ability to set pay;
- Linked pay and awards to employee contribution to mission; and
- Rewarded high contributors, and encouraged low contributors to improve.

Similarly, AcqDemo was designed to provide the following opportunities to employees:

- Allow rapid advancement without cumbersome promotion procedures;
- Provide flexibility to adequately compensate (salaries and awards) employees;
- Link employee work assignments to the mission of the organization; and
- Expand opportunities for training and development.

AEC employs the Contribution-based Compensation and Appraisal System (CCAS) for civilian performance management under the AcqDemo. CCAS is the set of appraisal processes that measure an employee's contribution to the mission of the organization. It replaces the Title 5 Civil Service General Schedule (GS) classification and pay system.

AEC employees are annually rated against six factors under CCAS: problem solving, teamwork and cooperation, customer relations, leadership and supervision, communication, and resource management. Descriptors and discriminators specific to the three career paths and broad band levels serve as the rubric by which ratings are determined. Salary adjustment and award decisions are linked to, and based on employee contribution. CCAS provides a great deal of compensation flexibility: employees have the opportunity to earn a larger-than-average salary increase if their contribution justifies it. On the other hand, employees could earn a smaller increase, or no increase at all (except locality pay), if their contribution does not measure up. Under CCAS, employees are rewarded just as their contributions merit; those not contributing at the required level will have to do better in order to receive monetary rewards.

Under CCAS, broadband classification and pay system replaces the General Schedule (GS) structure. The 15 grades of the General Schedule were used to classify positions and, therefore, to set pay. The salary range for a given broadband level of a career path corresponds to the General Schedule rates of basic pay for the grades that a particular broadband level encompasses.

Occupations with similar characteristics are grouped together into three career paths. Each career path consists of a number of broadband levels representing the phases of career progression that are typical for the respective career path. The broadband levels within each career path are shown in Figure 22, along with their GS equivalents. Movement within the broadband levels is based upon contribution. Movement to a higher broadband level is a competitive action (Department of Defense, n.d.).

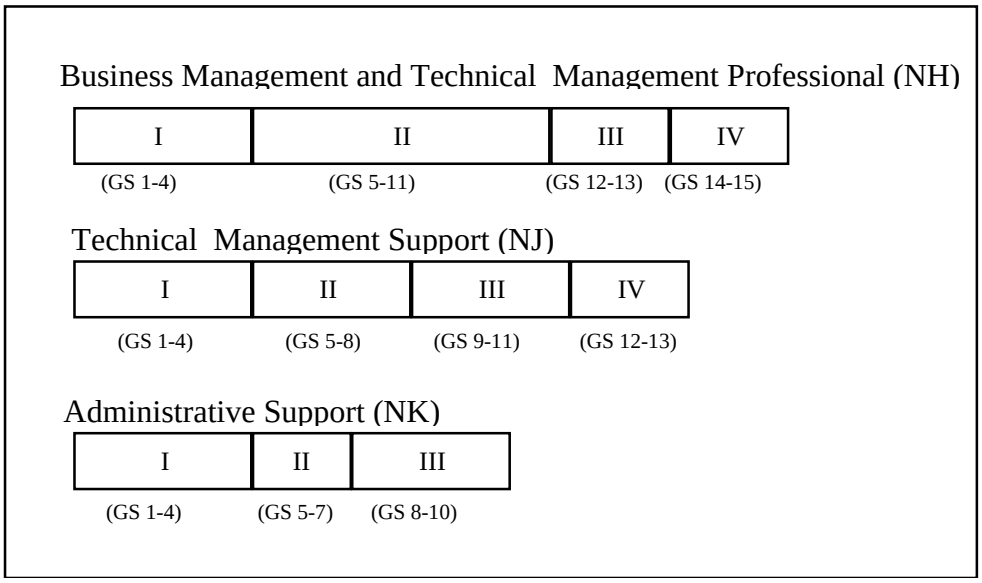


Figure 22. Broadbands and Paybands (from Department of Defense, n.d.)

As indicated in Figure 22, there are four broadband levels in the demonstration project, (labeled I, II, III, and IV) for two career paths: Business Management and Technical Management Professional, which encompasses GS-1 through –15; and Technical Management Support, which includes GS-1 through -13. There are three broadband levels for the Administrative Support career path, which includes GS-1

through -10. Comparison to the GS grades' rates of basic pay is used in setting the upper and lower dollar limits of the broadband levels. Once the employees are moved into the demonstration project, GS grades no longer apply. OPM classification standards are used to identify proper series and occupational titles.

Table 15 shows AEC TDA authorizations by career path and broadband. AEC total civilian authorized strength is 439. Table 15 does not include the 2 Senior Executives.

Broadband	Payband			
	02	03	04	Total
NH- Business Management and Technical Management	8	240	173	421
NJ – Technical Management Support	0	0	0	0
NK – Administrative Support	16	0	0	16
Total	24	240	173	437

Table 15. AEC Civilian Personnel by Broadband and Payband

b. Military Evaluation Reporting

The AEC military use the Army Evaluation Reporting System (ERS). The ERS evaluates the performance and potential of officers and noncommissioned officers (NCOs) as documented by Army Regulation 623–3 Evaluation Reporting System. The basic purpose of the ERS is to provide information for decisions on promotion, retention, and assignment, and to provide feedback to the individual. The evaluation report provides a centralized selection board the information necessary to individually rank order a population under consideration for promotion, retention or separation.

b. Human Resource Management

Personnel management is an essential, valuable, and expensive resource to manage for the organization. HR processes and procedures outlined in federal, DOD, and Department of the Army (DA) personnel rules and regulations assist in management of this resource. AEC is serviced by ATEC G-1 Directorate of Human Resources who is responsible for the processing of personnel actions to include recruitment. The staffing strategy and planning remain with AEC management.

(1). Recruitment, selection, retention, termination and/or retirement

The Office of Personnel Management and the Army Civilian Personnel system rules, procedures, and regulations govern the recruitment of AEC civilian personnel. Selection of new hires and promotions are primarily achieved through the same competitive process. All qualified applicants apply via an on-line civilian personnel system USAJOBS. Job announcements are posted for a specified period of time. Applicants meeting the predetermined qualifications (education requirements as well as Army Acquisition Corps certification) are referred from CPAC to the selecting official at AEC. Resumes are reviewed and placed into a competitive range to conduct interviews. The hiring official facilitates an interview panel which consists of subject matter experts and a representative of ATEC HQ when hiring a senior employee. Interviews are conducted and a selection is made. The entire process is reviewed by the ATEC Equal Opportunity Office.

Due to financial constraints, the civilian hiring process is subject to additional scrutiny to include re-reviews of positions previously approved for hiring, additional Civilian Personnel Advisory Center validation of hiring and selection approvals (to include incumbents previously validated for qualifications), and the initial area of consideration being limited to Army candidates in the local commuting area.

AEC also employs the Department of the Army (DA)'s Career Intern Program. The DA interns enter the program at the GS-5 and GS-7 levels as permanent full-time employees. Interns receive career/career-conditional appointments in the competitive service. DA interns reside on HQDA student detachment spaces and are funded by HQDA for the first 24 months. Upon graduation from the program, interns are placed on mission rolls in journey level GS-9 or GS-11 positions, according to the career program intern target grade and availability of placement positions.

AEC faces a growing challenge with many key employees becoming eligible to retire within the next five years. Of the 372 civilian full-time employees working within the organization in FY13, 10% are eligible for immediate regular retirement and another 24% are eligible for early retirement (Figure 23). The regular retirement eligible

population will grow significantly over the next five years to 20%. While AEC has not experienced a full out "wave" of retirement eligible employees during the past five years, succession planning and strategic goals must reflect the preparedness for such an occurrence.

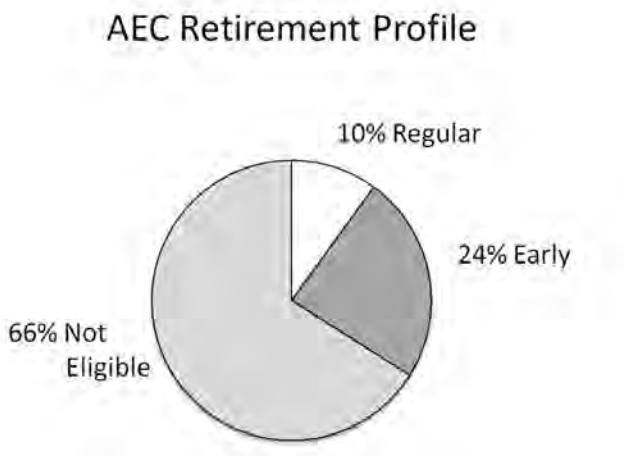


Figure 23. AEC Retirement Profile

ATEC is currently facing a turnover rate of 7% annually and anticipates this percentage to continue.

Figure 24. AEC Separation Profile

(2) Position Descriptions

A position description (PD) is a statement of the major duties, responsibilities, and supervisory relationships of a position. In its simplest form, a PD indicates the work to be performed by the position. The purpose of a PD is to document the major duties and responsibilities of a position, not to spell out in detail every possible activity during the work day.

AEC employees were under CCAS, NSPS and transitioned back to CCAS. From 2005–2011 timeframe, AEC was relocating from Alexandria to Aberdeen Proving Ground and supporting rapid acquisition. AEC employed PDs that provided great flexibility in hiring talent. The positions were designated as interdisciplinary (many job series assigned to a position) to allow for many selections against one job announcement. PD 90979 NH-****-03 Evaluator was open to 20 different job series in the mathematics, engineering and physical science disciplines. The major duties of PD 90979 read:

> Serves as a lead or member of an interdisciplinary team responsible for the planning, execution and reporting of a comprehensive evaluation of the effectiveness, suitability, and survivability of weapon systems in the acquisition process. The positions to be filled cross all mission areas and include one or more of the following areas of expertise: Technical performance of weapon systems, reliability analyses, Integrated Logistics analyses, all areas of Survivability and lethality analyses, Modeling and Simulation, database development, Statistical analysis, Operations Research Analysis, Software analysis, and analysis of the Operational capabilities and limitations of weapon systems. "Weapon Systems" include all Army materiel in the Acquisition Process, systems to be fielded to Army units or Joint systems in which the Army has significant participation. Leads or contributes to the development of all Test and Evaluation related documentation in ATEC including the System Evaluation Plan, the Individual Event Plan, System Assessments, the System Evaluation Report and the System Analysis Report. Reviews or contributes to all T&E related documentation prepared by other major commands to include Test and Evaluation Master Plans, Operational Requirements Documents, and Critical Operational Issues. Monitors test execution, data collection, and data base development. Synthesize data from, modeling and simulation, experimentation, technical and operational testing to assess overall system capabilities and limitations. Interacts with program managers and other members of the acquisition community to ensure a comprehensive Test & Evaluation program is conducted. Prepares written analysis, evaluations, and briefings to support Army and

DOD materiel decision-making. Develops, presents, and defends presentations within ATEC, to senior Army leadership, DOD officials, and at appropriate symposia.

The PD flexibility for hiring does not lend itself to workforce reshape actions such as Voluntary Early Retirement Authority (VERA)/Volunteer Separation Incentive Program (VSIP) as it appears as if all individuals on the same PD have the same exact skill mix.. The commodities that AEC evaluates differ and requires different subject matter expertise (air defense systems have different technological and operational capabilities than C4ISR systems).

(3). Right People on Board

The manning document or "working TDA" is the tool that tracks "faces" to TDA "spaces." The manning document is used to track the on-board workforce to include identifying vacancies, employees on detail or temporary promotion, local interns and the Internship Program (formerly known as the Student Career Experience Program (SCEP) and Student Temporary Employment Program (STEP).

The Office of Personnel Management (OPM) developed position classification standards to define occupation series, establish official position titles and describes the various levels of work. Additionally, OPM developed the General Schedule Qualification standards which an individual must meet to be hired into the position (Office of Personnel Management, n.d) http://www.opm.gov/policy-data-oversight/classification-qualifications/general-schedule-qualification-standards/#url=Group-Standards. Table 16 shows the current on-board occupational series by grade.

Series	Grade					
	SES	02	03	04	GS-11	Total
00180 - Engineering Psychologist			1			1
00301 - Misc Admin and Program		2	13			15
00318 - Secretary		3	9			12
00344 - Management and Program Clerical Assistant		2				2
00346 - Logistics Management Specialist			10	3	1	14
00401 - Natural Sciences - Biology			4			4
00801 - General Engineer	1		23	34	1	59
00830 - Mechanical Engineer			29	25	3	57
00850 - Electrical Engineer			11	5		16
00854 - Computer Engineer			4	1		5
00855 - Electronics Engineer			6	14		20
00861 - Aerospace Engineer			3	1		4
00893 - Chemical Engineer			4	1		5
01083 - Technical Editor		1	2			3
01087 - Editorial Assistant		1				1
01301 - Physical Scientist	1		5	3		9
01320 - Chemist			3	1		4
01515 - Operations Research Analyst			61	60		121
01520 - Mathematician			6			6
01529 - Math-Stat			7	1		8
01550 - Computer Scientist			3			3
02210 - IT Specialist			4	3		7
Total	2	9	208	152	5	376

Table 16. AEC Civilian On-board by Occupational Series and Grade

Most of AEC's position are classified as professional and scientific positions and require a bachelor's or higher degree. However, there are a few series where the degree requirement is not aligned with AEC needs. An example is the 1515 Operations Research Analyst. The OPM general schedule qualification standard for Operations Research series, 1515 as published on the OPM website states:

> Degree: in operations research; or at least 24 semester hours in a combination of operations research, mathematics, probability, statistics, mathematical logic, science, or subject-matter courses requiring substantial competence in college-level mathematics or statistics. At least 3 of the 24 semester hours must have been in calculus.
>
> Courses acceptable for qualifying for operations research positions may have been taken in departments other than Operations Research, e.g., Engineering (usually Industrial Engineering), Science, Economics, Mathematics, Statistics, or Management Science.

Degrees in economics, management science and business do not necessarily offer the level of probability and statistics and high-level mathematics required to support the AEC mission.

(4). Civilian Age

AEC has a mature workforce; average age is 45, median age is 47. Youngest employee is 19 years of age and oldest employee at 71 years of age.

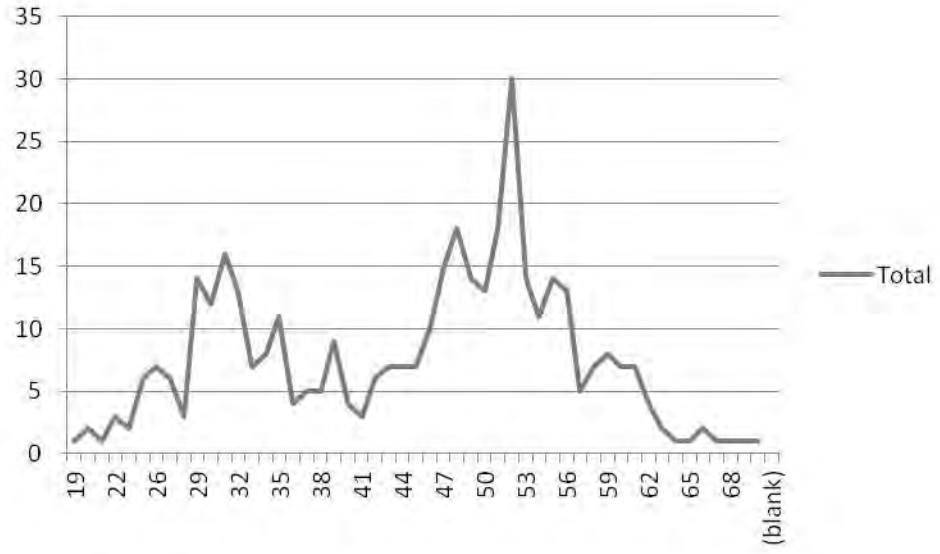


Table 17. Civilian Age Profile

(5). Civilian Length of Service

Although AEC's workforce is fairly mature, the average years of service is 13 years. Five employees have less than a year of service; one employee has over 40 years of service. The low average years of service may be due to lack of military time or contractor time counted.

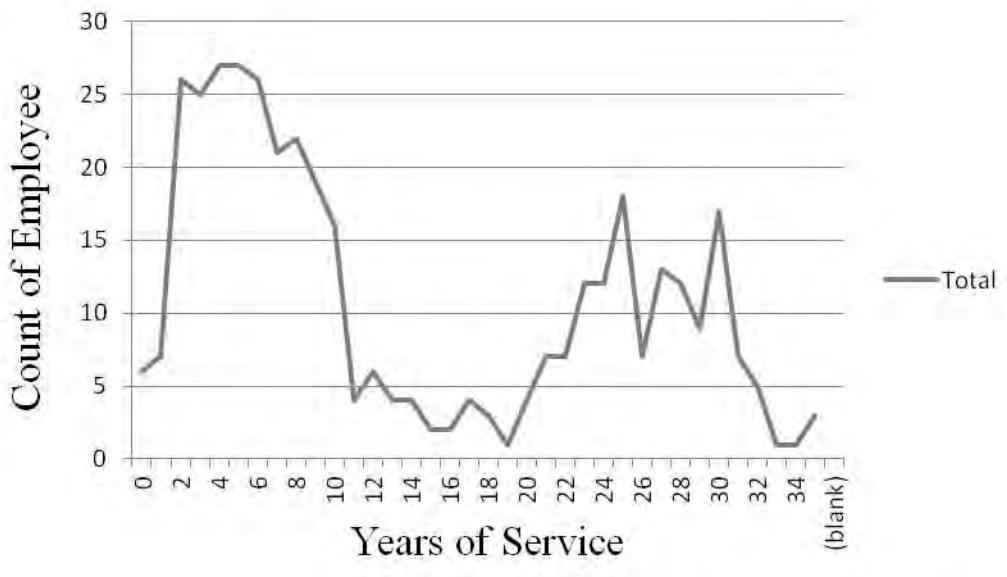


Table 18. Civilian Years of Service

(6). Training and Development

Training programs are developed specifically to enhance technical, administrative or procedural understanding of AEC's mission. AEC's mission depends on the development of the workforce's technical and leadership skills.

a. Civilian Education System

As a result of changing roles and responsibilities of the Army Civilian Corps, the Army implemented the Civilian Education System (CES) in 2007, modeled after the established officer and NCO education system. The CES provides progressive, sequential leader development training and education. Army Regulation 350–1 (2009) states the CES will "prepare agile and innovative Army civilians who can lead during times of change and uncertainty; are prepared for the rigors of service as multi-skilled leaders; and are armed with the values, skills and mindset to serve as competent, resilient supervisors and managers." Courses include the Foundation Course, Action Officer Development Course, Supervisor Development Course, Basic Course, Intermediate Course, and Advanced Course. All AEC employees are required to complete the CES program in order to be considered for senior level positions.

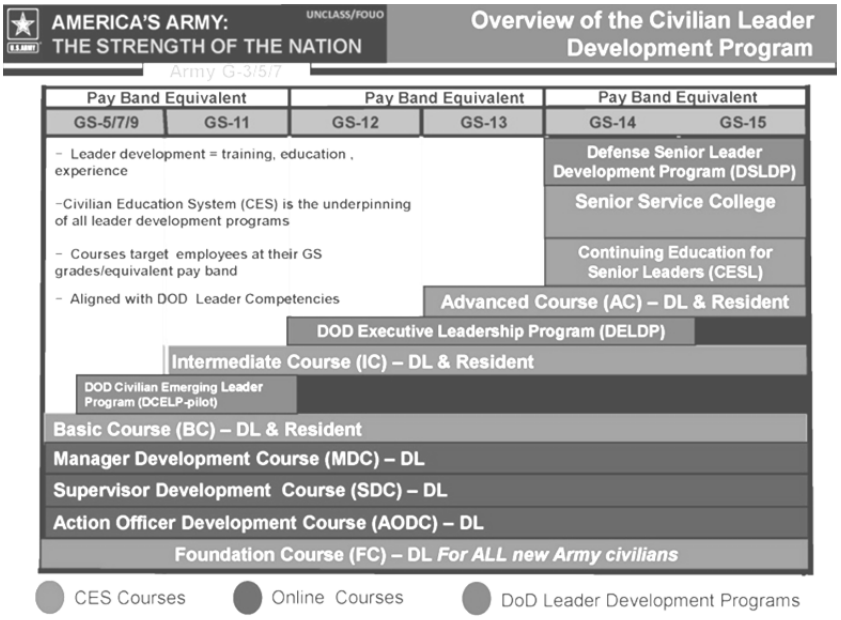


Figure 25. CES Leader Development Program (from U.S. Army, n.d.)

b. Career Program Training.

Career paths blend the leadership, management, scientific, and functional competencies, assignments, and training guidance needed by civilians who aspire to key civilian leadership positions within the Army in specific career programs.

AEC civilian career programs (CPs) as documented on the approved FY13 TDA:

CP	Number of Authorizations	Description
16	97	Functions as research, design, development, test and evaluation, production, installation, operation, and maintenance; data collection; processing and analysis; and material resources operations.
17	10	Materiel Maintenance Management; Maintenance Management starts with the initial concept and design of materiel and follows through sustainment and life cycle extension; concerned with the reliability and maintainability of the new item, its technical description, and the supporting publications which describe how to properly use and maintain it.
34	3	Information Technology Management; support the Army's critical IT/Cyber mission; 2210 Series (IT Management) consists of the following eleven parenthetical titles: Application Software; Customer Service; Data Management; Enterprise Architecture; Internet; Network Services; Operating Systems; Policy & Planning; Security; Systems Administration; and Systems Analysis. The 391 Series (Telecommunications) and 301-i Series (Information Management)
36	155	Analysis, Modeling and Simulation; use of simulation to improve training, mission, rehearsal, planning, experimentation, acquisition, and operations.
BLANK	174	

Figure 26. AEC Civilian Personnel by Army Career Path

39.6% of AEC authorizations show no career path selected. As a result, the incumbents in these positions may not receive supported training and education plan from centralized funding. This places a burden on an already stressed AEC budget.

c. Acquisition Corps Requirements.

The Defense Acquisition Workforce Improvement Act (DAWIA) of 1990 mandated the establishment of an Acquisition Corps in each of the Services and at least one corps for DOD agencies. The purpose of the Acquisition Corps is to certify and recognized the acquisition workforce for having achieved professional status. Certification is the procedure through which a military service or DOD Component determines that an employee meets the education, training, and experience standards required for a career level in any acquisition, technology, and logistics career field. Civilian positions and military billets that are in the DOD acquisition system, have acquisition duties, and fall in an acquisition position category established by the Under Secretary of Defense for Acquisition and Technology (USD(A&T)). There are several acquisition position categories to include auditing; business-cost estimation; business-

financial management; contracting; engineering; facilities engineering; information technology; life cycle logistics; production, quality and manufacturing; program management; purchasing; science and technology management; and test and evaluation.

AEC's positions are coded as follows:

T–Test and Evaluation	352
A–Program Management	82
L–Life Cycle Logistics	27
S - SPRDE-Systems Engineer	2
Z - Unknown	8
2–Acquisition Attorney	1
Blank	91
	563

Figure 27. AEC Civilian and Military Acquisition-coded Positions

The position coded as an Acquisition Attorney is in error (position is Test and Evaluation). The 8 positions coded with 'Z' should be 'A' (Program Management). The 91 positions with no acquisition coding include program specialists, executive assistants, technical editors, secretaries, COCOM IATF Division (non-acquisition mission) and operational officers and NCOs.

d. AST 101.

AST 101 focuses on the roles and responsibilities of the ATEC System Team (AST), the technical and project management skills necessary to be an evaluator or analyst, references and resources for job assistance, and the opportunity to complete practical exercises relevant to the AST function (Boggs, 2012).

e. Test and Evaluation Basic Course.

The Test and Evaluation Basic Course (TEBC) consists of two parts, an on-line training (OLT) and a Resident Seminar (RS). Both are essential components of ATEC's initial training program. Personnel in Test and Evaluation positions must complete the OLT within the first 2 months of assignment and must also complete a Resident Seminar (RS) within 6 months. Personnel in positions that are not part of an ATEC System Team

are not required to take the TEBC RS. The TEBC OLT provides a mandatory in-depth orientation for all newly assigned personnel. The TEBC RS is a detailed (35 hours) seminar that provides “how-to” instruction by subject matter experts to ATEC testers, evaluators, analysts and other personnel as designated by their chain-of-command.

f. New Employee Orientation.

In concert with HQ ATEC, AEC executes a new employee orientation (NEO) for its employees (military and civilian) every six months. The purpose of the NEO is to provide training on the mission, tasks, structure, processes and procedures of the organization. Day 1 consists of command overviews are provided of each ATEC element. Each staff element provides an overview of services provided as well as points of contact. A working lunch is scheduled which provides an opportunity for employees to ask questions of the ATEC Command Group. The NEO ends with a tour of Aberdeen Test Center which provides a first-hand look at the test capabilities available. Day 2 consists of briefings focusing on AEC to include overviews of the AEC directorates; question and answer session with the AEC Command Group; CSM Top Nine; AST Basics & Mock AST; Program Manager’s Perspective; DOT& 101 and DASD (DT&E). Day 3 focuses on personnel processes such as rating and awards, training and development, administrative tools, Family Readiness Group and Army 101 for those civilians that are new to the Army.

g. Career Management Road Maps.

AEC developed structure, detailed roadmaps for career management. These roadmaps include technical training and leadership development and integrate requirements from DAWIA, CES and other initiatives. Formal education, on-the-job training and experience play a pivotal role in developing the AEC workforce. Career Programs 13/17/24 (Supply, Maintenance & Transportation), 16 (Engineer & Scientist) and 36 (Analysis, Modeling and Simulation) are completed and are required for use in career counseling and IDP development.

h. Developmental Assignments.

AEC uses developmental assignments to broaden employee capabilities and knowledge by providing an opportunity to perform duties in other occupations, functions, or agencies. Participants are given broadening experiences in diverse fields through various job rotations and cross functional assignments. Employees gain competencies necessary to be competitive for positions of greater responsibility, as well as managerial and leadership positions within the Department of Defense. At the end of FY13, 16 individuals were on developmental assignment to Army Materiel Systems Analysis Activity (AMSAA), U.S. Army Deputy Chief of Staff G-4 Logistics, 21st Theater Sustainment Command (TSC) Germany, Aberdeen Test Center, ATEC HQ Office of Chief Counsel, Edgewood Chemical-Biological Center, DOT&E, Missile Defense Agency, Army Research Laboratory, ATEC HQ G-1 Human Resources Directorate and Corps of Engineers.

i. Mandatory Training

All ATEC military personnel and Government civilians are required to complete mandatory training. Required courses are announced through the ATEC Training Tracker Module (ATTM) system.

- Anti-terrorism, Level I
- Army Substance Abuse Program
- Army Suicide Prevention Program
- Suicide Prevention - Face to Face
- Combating Trafficking in Persons (CTIP) Program
- Composite Risk Management
- Constitution Day Training
- Equal Opportunity Program
- Ethics
- Operational Security (OPSEC)
- Sexual Harassment/Assault Response Prevention (SHARP)
- SHARP Team Bound
- Subversion and Espionage Directed Against the U.S. Army (SAEDA)

- Threat Awareness and Reporting Program (TARP)
- Defense Travel System (DTS) Basic–DTS Travel Documents
- Programs & Policies–Travel Policies
- Programs & Policies–Travel Card Program
- Annual Security Refresher Training
- Cyber Awareness Challenge
- Safe Home Computing
- Personally Identifiable Information (PII)
- Portable Electronic Devices & Removable Storage Media
- Phishing Awareness
- Army G3 Computer Security Training

In addition to the Army mandatory training, ATEC HQ requires each individual to complete "Release of ATEC Test and Evaluation Data."

j. Supervisory Training. Defense Authorization Act of 2010, Section 1113, established the requirement for services to provide mandatory training for all new and experienced supervisors. New supervisors must complete the initial training within a year of their assignment. Experienced supervisors must complete refresher training at least once every three years. Topics include: Workforce Planning, Position Management and Classification, Hiring, Merit Systems Principles and Prohibited Personnel Practices, Onboarding, Performance Management, Training and Development, Recognition, Incentives and Awards, Coaching, Counseling and Mentoring, Leave Administration, Workers' Compensation, Labor Relations, Supervising a Diverse Workforce, Hostile Work Environment, Reasonable Accommodations, Creating an Engaging Work Environment, Managing Conflict, Valuing Individual Differences, and Leading Change. ATEC HQ G-1 Human Resources Directorate coordinated workshops with outside vendors on various topics to increase supervisor competencies.

k. Military Leader Development and Training.

Military are assigned to AEC as a broadening assignment. Soldiers assigned to AEC are selected to attend Army schooling to include Advanced Noncommissioned Officer Course (ANCOC), Command and General Staff College (CGSC) and School for

Command Preparation (pre-command course). Military assigned to AEC attend the New Employee Orientation, AST 101 and mandatory annual training.

(7). Reward Programs

The final sub-factor in HR Management is the rewards program, opportunities for advancement, compensation packages, and recognition.

AEC actively recognizes civilian employees through honorary awards to include AEC Civilian Employee of the Quarter, the Baltimore Federal Executive Board Excellence in Federal Career awards as well as Achievement Medal for Civilian Service, Commander's Award for Civilian Service and Superior Civilian Service Awards. AEC also recognizes military members by issuing awards such as the AEC Military Member of the Quarter and Military Outstanding Volunteer Service awards. Military are also recognized with permanent change of station (PCS) awards when changing duty stations.

c. Communication, Information Planning and Decision-Making

(1) Planning

The Strategic Initiatives Group (SIG) reports directly to the AEC Technical Director and performs integration and synchronization of initiatives. The Current Operations (OPS) cell reports to the AEC MILDEP and is responsible for assessing the current situation and day-to-day operations of AEC. The SIG is responsible for future operations (FUOPS) planning and assessing for the mid-range time horizon and is responsible for strategic planning for the mid to long-range time horizons. The SIG and OPS use military decision making process (MDMP) and other techniques when making recommendations to the AEC leadership.

(2) How information is gathered

Within AEC, there are no formal methods for gathering information. AEC uses many IT systems to execute the supporting functions to support the mission.

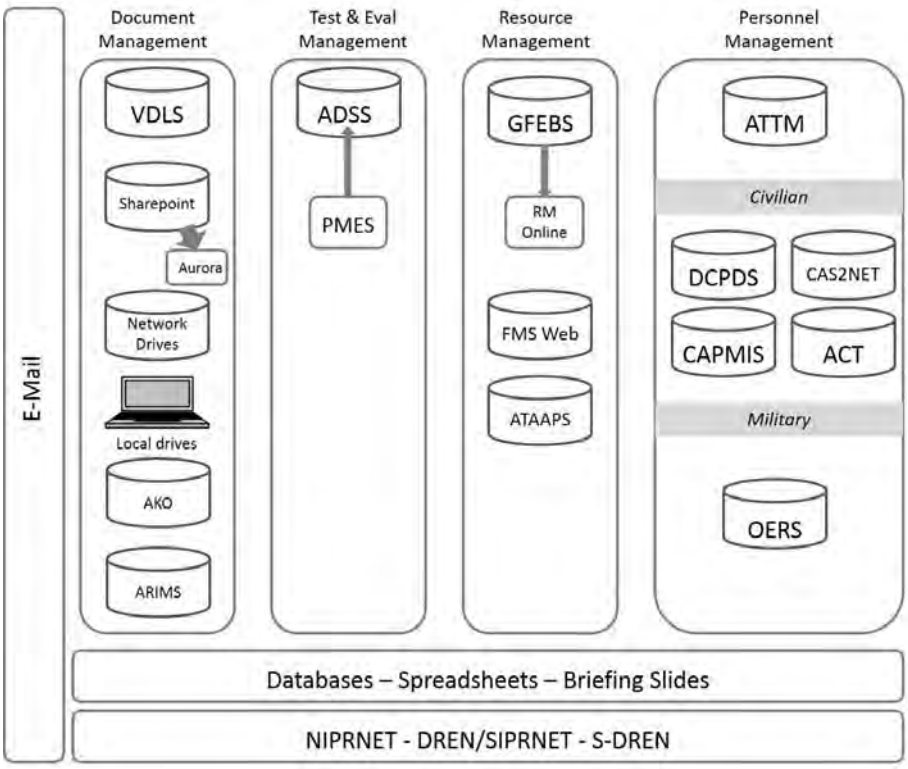


Figure 28. IT Systems used by AEC

Document Management. A minimum of six different systems are used for document management within AEC.

- VISION Digital Library System (VDLS) serves as a digital repository for all ATEC T&E documentation, providing a complete record of tests and necessary reference materials.
- Sharepoint is a portal for local applications and document management
- Aurora is an electronic staffing system that provides an automated movement of documents through the review and approval process from submission through the AEC Office of the Director to ATEC Headquarters levels. It provides the ability to create on-line electronic staffing packages and automatically manage the movement of these packages through the staffing processes.
- Network drives are available for document storage. The drives are partitioned by directorate. File sharing across the center is not currently supported.
- Local drives are used for working documents.

- Army Knowledge On-line (AKO) is an Army-wide document management system. AEC uses AKO to share information with organizations outside of the ATEC network.
- Army Records Information Management System (ARIMS) is an Army-wide records management system. In conjunction with the DA requirements and the implementation of Aurora, all final documents will be placed into the Army Records Information Management System (ARIMS). ARIMS will serve as the final repository for all Government business-related documents.

Test and Evaluation Management. AEC uses one system and one module to manage test and evaluation efforts.

- The ATEC Decision Support System (ADSS) is ATEC's tool for management of T&E activities. It is a database which includes planned and actual milestone dates for systems and individual efforts. It is an entry point for customers to submit requests for test services. Separate modules exist for continuous evaluation (CE), rapid initiatives (RI), developmental testing (DT) and operational testing (OT). ADSS is used to release the test directive authorizing the ATEC TCs to work on an effort.
- The Project Management Module (PMM) is the Microsoft® Project interface to ADSS.

Resource Management. As stated previously, ATEC HQ provides staff services for AEC. The systems used solely by the ATEC staff are not listed.

- General Funds Enterprise Business System (GFEBS) is the Army's financial, asset and accounting management system.
- RM Online is a web-based, integrated resource management system for budgeting, manpower and personnel
- FMS Web is the Army system to documents manpower and equipment requirements and authorizations
- Automated Time Attendance & Production System (ATAAPS) is the DOD system that accurately record time and attendance while capturing labor hours by job order (task).

Personnel Management. AEC personnel access several systems to manage their careers from performance management to professional development.

- ATEC Training Tracker Module (ATTM) is the system in place to manage annual mandatory training.
- Defense Civilian Personnel Data System (DCPDS) is the database of record for Army civilian personnel data

- CAS2NET is the performance management system for acquisition demonstration employees.
- Career Acquisition Personnel and Position Management Information System (CAPPMIS) is a portal for acquisition personnel to access applications such as Acquisition Career Record Brief (ACRB), Individual Development Plan (ID), Senior Rater Potential Evaluation (SRPE), Certification Management System (CMS), Army Acquisition Professional Development System (AAPDS) and Army Acquisition Corps Management System (AAC MS).
- Army Career Tracker (ACT) Army Career Tracker (ACT) is a leadership development tool that integrates training and education for civilian and military.
- Evaluation Reporting System (ERS) is the performance management system for military personnel.

With the proliferation of IT systems within the Army, there should be a natural progression from information management to knowledge management. Army Field Manual FM 6–01.1 Knowledge Management Operations states:

> Knowledge management provides the means to efficiently share knowledge, thus enabling shared understanding and learning within organizations. To do this, KM creates, organizes, applies, and transfers knowledge and information between authorized people. It seeks to align people, processes, and tools—to include information technology—within the organization to continuously capture, maintain, and re-use key information and lessons learned to help units learn and adapt and improve mission performance. KM enhances an organization's ability to detect and remove obstacles to knowledge flow, thereby fostering mission success. Because collaboration is the key contributor to KM, it is imperative that everyone be involved in the process, from the generating force that trains and sustains the Soldier to the operating force, which ensures Soldiers survive and thrive every day in every circumstance or location

AEC is in an embryonic state regarding Knowledge Management. An example where AEC is progressing in KM is the Center for Reliability Growth (CRG). CRG is a joint AMSAA-AEC partnership that works towards improving reliability by providing policy, guidance, standards, methods, tools, and training. The CRG maintains a collection of key reliability tools, models, and documents. By capturing and archiving actual test metrics/data, the models and tools are validated and improved.

(3) How the organization communicates

It is common knowledge that effective communication at all levels is essential to an organization's success. With the pace of working in a dynamic environment, communication increases in importance, but may be inadequate due to time pressures. AEC leadership communicates through electronic mail and quarterly "all hands" meetings. "Understanding" newsletters with updates on the strategic initiatives, "Ask the Director" page, "News you Can Use" are posted to the AEC SharePoint site for personnel to review and reference. Regular weekly meetings with the supporting HQ ATEC staff are held to maintain consistent communication between the evaluation directors and senior management.

(4) How decisions are made

ADP 5–0 Operations Process governs how Army staffs plan. Due to the environment of BRAC and supporting an Army at war, AEC became victim to the "tyranny of the urgent." "Mini-MDMPs" were executed due to collapsed timeframes and many of the steps of MDMP as defined in ADP 5.0 were skipped. Decisions were made with the best limited information available without supporting, formal analysis. AEC is re-establishing formal planning processes and is transitioning out of reactive to proactive operations.

(5) Acquisition and contracting

AEC currently uses contractors to augment the current civilian and military workforce; the products provided are not the conclusions of the final evaluation product but may include data reduction and analysis, data bases (and management) and data produced by models and simulations. The efforts performed by contractors are fully reimbursed by the customer. AEC civilian and military personnel provide technical and administrative oversight and control of all contractor efforts.

C. RESULTS

The results component of the OSF model includes the organization's culture, outputs, and outcomes

1. Culture

By applying the OSF model, the throughput or design factors, e.g., tasks, technology, structure, people, and processes, were used to describe AEC. The next portion of the model involves the culture of the organization. Organizational culture describes the values and assumptions shared within an organization. Norms are defined as the informal rules and shared expectations that groups establish to regulate the behavior of their members (McShane & Glinow, 2009, p. 328).

a. Military-Civilian

There is a varying mix of civilian and military personnel in all types of positions at AEC. Both types of personnel bring different but important skill sets, and both are critical to mission success. The military and civilian workforces do have different organizational cultures.

Military culture is based on the unique tradition, mission, structure and leadership of military history. Military culture maintains distinct sub-cultures within the Army branches, that have unwritten sets of rules, viewpoints, perspectives and operating procedures (Military Cultural Awareness for Hiring Managers, n.d.). Some of the main characteristics of the military organizational culture include:

- Highly structured and authoritarian way of life with a mission-focused, goal-oriented approach—both explicit and implied
- Strict sense of discipline, tending to adhere to rules and regulations
- Strong work ethic with high regard for physical and mental strength
- Code of conduct and organizational culture that reflects well-defined and strongly supported moral and ethical principles
- Decisive leadership that expects loyalty of subordinates and allies

In contrast, the AEC civilian culture is slightly different than the military culture. AEC's civilians are mostly scientists and engineers and were brought up to ask "Why?" Unfortunately, the question "Why?" is perceived as a challenge to the order or task given. Many times the civilians need to understand the order or task given prior to execution.

There are varying rules and expectations for military and civilian personnel within AEC, even when holding the same positions and performing the same type of work. An example is hair grooming standards. Army Regulation 670–1 Wear and Appearance of Army Uniforms and Insignias governs hair and grooming practices for the Soldiers assigned to AEC. Soldiers are authorized to leave their duty station and get a haircut; civilians have no requirement for hair and grooming (other than hygiene) and therefore, haircuts are scheduled for outside of working hours.

Other difference between the military and civilian workforce culture include:

- Attire–the military can wear the same uniform to any meeting; civilians wear suits to high-level briefings
- Time & Attendance–military are "24/7"; civilians are 40 hours per week
- Physical Training–required by military and is authorized as part of the work day; optional and is on the civilians' own time
- Training Holidays–military can take advantage of a training holiday which is a free day that does not count as leave; civilians do not have this option.
- Leave–Military earn 30 days of leave a year regardless of time served; civilians start with 4 hours per pay period, increasing to 8 hours per pay after 15 or more years of service
- Sick leave–Military do not have sick leave; civilians earn 4 hours per pay period

AEC effectively integrates the two cultures, while allowing both cultures to exist. Civilians are invited to the Officer Professional Development (OPD) sessions as well as celebrations such as the Army's Birthday cake cutting. AEC executes several team-building to include the "Turkey Bowl" which is an officer against NCO flag football game with civilians augmenting both teams. CG, ATEC leads monthly runs the last Friday of the month. The run is mandatory for military and civilians are invited and encouraged to participate.

b. Conflict Resolution

A common obstacle to effective management and building consensus in many organizations is the reluctance of personnel to elevate issues to the supervisors and senior leaders for resolution. This can result in wasting valuable time while attempting to solve

problems that: 1) are beyond the control of action officers, and 2) within senior leaders' ability to resolve easily based on relationship or having a broader view of the multitude of challenges the organizations and the Army are facing. Some consider elevation of an issue as a weakness (ie. they failed because they could not individually solve the issue).

Only one formal policy exists for conflict resolution. Director's policy letter #1 focuses on the Open Door Policy. The intention of the Open Door policy is to assist conflict resolution within the center. The guidance in the letter states that the issue needs to come up through the chain of command. Unfortunately, the AEC workforce interprets "open door" policy as a "walk-in."

2. Outputs

Outputs of a system are the goods and/or services produced by the organization. It is important in the application of the OSF model to recognize how the outputs are measured and to identify the indicators of performance. The outputs for AEC take the form of information, formal and informal, written and verbal. A listing of AEC developed products as defined in ATEC Regulation 73–1 to support the acquisition cycle:

a. Products

- Army Input to Evaluation Plan. For multi-service and joint programs where ATEC is not the lead OTA, the AST will provide Army unique input to the lead OTA. Their input is documented in the Army Input to Evaluation Plan
- Army Input to Evaluation Report. For multi-service OT where ATEC is not the lead, the AST will provide Army unique input to the lead OTA by means of a document called Army Input to Evaluation Report. Timelines will be documented in ADSS.
- Acquisition Position Memo - ATEC is required to provide a MR Memorandum along with either an OER or an OMAR and Safety Confirmation to the PM and Life Cycle Management Center MR Office in support of Type Classification and MR. The Materiel Release Memorandum provided with the OER/OMAR should present an ATEC position relative to the proposed materiel release. The memorandum should either recommend full materiel release or conditional materiel release identifying conditions to be resolved before considering full materiel release.

- Acquisition Document Review Memo
- Capabilities & Limitations Report–A report for the Commander informing what is known and what is not known about a rapid initiative system.
- Capabilities & Limitations Report–Update–An update to a
- Concept In-Process Review ATEC senior level leadership review to obtain ATEC leadership approval of the set of tests selected to support the approved evaluation strategy (See definition for ESR).
- Concept In-Process Review - Update
- Emerging Results Brief - AEC may prepare an Emerging Results Briefing (ERB) prior to the CLR, if requested by the PM. An ERB is understood to be draft in nature and does not negate the need for a CLR. The ERB is approved by the AST Chair's Directorate Chief.
- Early Strategy Review ATEC senior leadership level review to obtain ATEC leadership approval of the system evaluation concept developed by the AST. The ESR addresses the overall evaluation concept that must be resolved before a system can proceed to FRP. The AST will document the approved concept in the SEP. The approved test strategy needed to support the evaluation strategy is coordinated with the T&E WIPT and presented for ATEC leadership approval at the concept in-process review (CIPR) (See definition of CIPR).
- Early Strategy Review - Update
- OTA Assessment Report - The OAR is not tied to an MDR. It provides an evaluation of progress towards meeting system requirements at other times than milestones and FRP decision if requested. The OAR may identify needed corrective actions; assess readiness for IOT; evaluate the system's logistic supportability and MANPRINT, etc.
- OTA Evaluation Report - Documents the independent system evaluation findings and recommendations regarding a system's operational ESS and safety as well as a system's mission capability. It is provided at FRP Decision Review and is supported by a SAR. The SAR, if required, provides the detailed analyses to support the evaluation.
- OTA Evaluation Report–Update
- OTA Follow On Evaluation Report Provides additional information on the efficacy of corrective actions for system deficiencies found during the IOT. OFERs therefore are submitted to decision making officials after the FRP decision is made
- OTA Milestone Assessment Report OMARs provide the decision authorities with an independent assessment of the system's performance and operational effectiveness, suitability and survivability at MS B and MS C Low Rate Initial Production (LRIP). Required to be completed by the AST

within the E+60 day or no later than Milestone Decision Review (MDR)-45 day timeframe.

- Safety Confirmation A document issued by AEC that provides the Materiel Developer and the decision maker with the test agency's safety findings and conclusions, and that states whether the specified safety requirements have been met, includes a risk assessment for hazards not adequately controlled, lists any technical or operational safety limitations, and highlights any safety problems requiring further testing. The Safety Confirmation may be attached to the OER, OAR, or OMAR as applicable. For aviation testing, an Airworthiness Release does not negate the need for a Safety Confirmation.
- Safety Confirmation Recommendation - Issued to other services, joint services, Foreign Military Sales (FMS), and USSOCOM when requested. Recommendations provided by AEC to non-Army organizations will be written to the government project sponsor for that item. If the materiel is also being fielded to the whole Army, then a SC will be provided by AEC.
- System Evaluation Plan - The SEP documents the ATEC plan for the approved integrated system T&E strategy for overall system evaluation. The SEP describes the strategy for assessing ESS and evaluating the contribution of the system to overall mission capability. The SEP also describes the strategy for identifying system capability limitations and assessing risks and the potential impact on mission capability. It includes refinement of the planned evaluation support to be provided to the decision body and the refinement of the test, M&S, and analysis event strategies necessary to support the evaluation.
- System Evaluation Plan - Update
- Safety Release = A formal document issued by AEC before any hands-on testing, training, use, or maintenance by Soldiers. A Safety Release is issued for a specific event at a specified time and location under specific conditions. It is a stand-alone document that indicates the system is safe for use and maintenance by Soldiers and describes the specific hazards of the system based on test results, inspections, and system safety analysis. Operational limits and precautions are included. The Safety Release must be available prior to start of testing, training, etc. For aviation testing, an Airworthiness Release does not negate the need for a Safety Release.
- Safety Release Recommendation - Issued to other services, joint services, Foreign Military Sales (FMS), and USSOCOM when requested. Recommendations provided by AEC to non-Army organizations will be written to the government project sponsor for that item. If the materiel is also being fielded to the whole Army, then a SC will be provided by AEC.
- System Analysis Report (SAR). Provides the detailed analysis that supports ATEC findings as reported, but in a less restricted time frame than the OMAR/OER/OFER. If required, the SAR will be produced by the AEC 60 days after the OMAR/OER/OFER is completed. The SAR documents the

analyses that were conducted but not presented within the OMAR/OER/OFER.

- Test & Evaluation Concept Briefing. In order to carry out the Secretary of Defense's responsibilities under Title 10, Section 139, U.S. Code requires DOT&E to monitor and advise the Secretary of Defense of the capability and resources of the OTA to adequately plan, execute, and report on the OT. Within ATEC, the AST fulfills the function of obtaining DOT&E approval of the test concept by means of the Test Concept Brief. The briefing is provided to the appropriate Deputy Director of DOT&E no later than 180 days prior to the planned first day of OT (T-180). The intent is to gain early DOT&E understanding and approval of the proposed test concept and resolve key issues, if necessary, prior to finalizing the OTA TP.
- Input to Test & Evaluation Master Plan - The TEMP is the basic planning document for a system life cycle T&E. The TEMP documents the T&E strategy and is developed and initially approved prior to program initiation. The TEMP is then updated prior to each subsequent MS and FRP decision review thereafter or for a major modification. It is the reference document used by the T&E community to generate detailed T&E plans and to ascertain schedule and resource requirements associated with a given system. The TEMP describes what testing is required, who will perform the testing, what resources will be needed, and what the requirements are for evaluation.
- Test & Evaluation Strategy - The TES integrates all T&E activities supporting the program and takes full advantage of existing investments in DOD ranges and facilities. The T&E strategy supports the requirements and acquisition strategies. It describes how the system concept will be evaluated against mission requirements.
- Requirements documents. JCIDS documents serve as a means for sponsors to submit identified capability requirements and capability gaps, along with other relevant information, for review and validation." For materiel solutions, the JCIDS documents of interest to T&E are the initial capability document (ICD), capability development document (CDD), the capability production document (CPD), the urgent operational need (UON), and the joint UON (JUON) or joint emergent operational needs (JEON).

b. Measurement

Product	Acronym	Number Produced
Army Input to Evaluation Plan	AIAR	1
Army Input to Evaluation Report	AIER	1
Acquisition Position Memo	APM	31
Acquisition Document Review Memo	ADR	63
Capabilities & Limitations Report	C&L Report	50
Capabilities & Limitations Report–Update	C&L Update	26
Concept In-Process Review	CIPR	15
Concept In-Process Review - Update	CIPR - U	1
Emerging Results Brief	ERB	1
Early Strategy Review	ESR	21
Early Strategy Review - Update	ESR - U	1
OTA Assessment Report	OAR	15
OTA Evaluation Report	OER	17
OTA Evaluation Report - Update	OER-U	1
OTA Follow On Evaluation Report	OFER	0
OTA Milestone Assessment Report	OMAR	20
Safety Confirmation	SC	132
Safety Confirmation Recommendation	SCR	21
System Evaluation Plan	SEP	4
System Evaluation Plan - Update	SEP-U	5
Safety Release	SR	97
Safety Release Recommendation	SRR	10
Test & Evaluation Concept Briefing	T&E Concept	39
Input to Test & Evaluation Master Plan	TEMP	39
Test & Evaluation Strategy	TES	2

Table 19. AEC FY13 Products with Counts

AEC established a customer survey program in FY13 with the purpose of providing information to formulate short and long term business improvement plans with the focus on improving customer satisfaction. The survey focuses on AST proficiency, product quality, technical adequacy, timeliness, cost, communication, responsiveness, and product satisfaction. A customer survey is sent to the customer for each product (as defined in the enclosure) prepared by AEC seven days after product distribution.

Currently the survey is sent to the Program Manager only. Quarterly tracking and reporting of survey results focusing on trends and systemic issues are presented to the AEC leadership. The follow-up actions from the survey results will help improve the AEC quality, helpful helpfulness, and timeliness and product satisfaction to the customer and to the acquisition process.

(1). Indicators of performance

AEC has limited formal metrics established for performance within AEC as it is difficult to measure performance in an intellectual environment. AEC relies on real-time feedback from decision-makers on the products provided; metrics against the AEC Strategic Plan and the common metrics used for resource management.

ATEC implements the Defense Equal Opportunity Management Institute's Organizational Climate Survey across the command. Military commanders are required to conduct a climate assessment within 120 days after assuming command, and at least annually thereafter. The climate survey anonymously assesses perceptions of organizational effectiveness, equal opportunity, equal employment opportunity, fair treatment, and sexual assault prevention and response. The detailed results from the survey are not available for analysis; however, the results drive the AEC strategy.

3. Outcomes

Outcomes are the intended and unintended consequences of the outputs for the stakeholders to include how they are viewed. Outcomes are the "so what" question following outputs and can be difficult to measure. Organizations often default to measures such as number of reports produced; number of hours worked, timeliness of products, etc.

AEC stakeholders include AEC Employees; Milestone Decision Authority (MDA); Program Executive Officers/Program Managers (PEOs/PMs); Director, Operational Test & Evaluation (DOT&E), Deputy Assistant Secretary of Defense (Developmental Test & Evaluation) (DASD(DT&E); operational units to include the individual Soldiers, sailors, air men and marines; and the American taxpayer.

The outcomes for AEC workforce include continued employment and job satisfaction. Job satisfaction is a fluctuating, measurable consequence of the AEC system. High job satisfaction leads to better retention and eases the recruitment needs of the organization.

The cost, schedule and performance of systems managed by the PEOs/PMs can be impacted if the products provided by AEC are not timely and accurate. It is well known that the costs to fix errors increase as the system matures. Correcting defects later in the system development life cycle has been estimated to add from 10 percent to 30 percent to the cost of each item (DAU, page 39). As costs and schedules increase, quantities are cut and the value to the operational force is reduced. It is imperative that AEC's insights to system performance be provided quickly and accurately.

T&E results figure prominently in the decisions reached at design and milestone reviews. T&E results may not always be favorable. The final decision responsibility lies with the decision-maker who weighs the system's capabilities and shortcomings with the acceptable risk. The MDA will be unable to make this judgment without a solid base of information provided by T&E. If the information provided by AEC is not timely, systems may proceed into operational test prematurely.

The outcomes for the DOT&E and DASD (DT&E) are similar to those of the PEO/PMs. If T&E is not adequate, significant problems in acquisition programs are may be discovered during operational testing that should have been discovered in developmental testing, potentially causing additional Congressional oversight and reporting.

Injury or death to operational units to include the individual are affected if equipment is fielded that is not effective, suitable or survivable. Additionally, equipment deemed as non-value will not be used, wasting taxpayers' dollars.

Taxpayers are affected if equipment is fielded that is not effective, suitable or survivable. An unintended consequence is the waste or misuse of taxpayers' dollars. When/if this occurs and the taxpayers become aware of the situation; the American public loses confidence in Army acquisition capabilities.

IV. ANALYSIS

As previously stated, Robert's OSF model was derived from the basic Inputs, Processes and Output model and Nadler and Tushman's congruence theory of organizations (Nadler & Tushman, 1980). It analyzes the components of an organization (inputs, throughput, and results) and assesses their congruence in order to draw conclusions and make recommendations concerning complex organizational behaviors.

According to Nadler and Tushman, a critical measurement of effectiveness is the alignment or congruence of an organization's components. Under the systems view of organizations, congruence can be defined as the degree to which an organization's components fit together. The basic hypothesis of the congruence theory is that the greater the degree of congruence or fit among an organization's components, the more effective the organization will be in achieving its intended strategy (Nadler & Tushman, 1980).

In the following section an assessment will be made on the congruence between the inputs, throughput, and results of the AEC organization. AEC does not have metrics in place to analyze these factors objectively. The level of congruence between factors was subjectively assessed based in the data and information presented in Chapter III. The terms that will be used to characterize the level of congruence between factors are "NA" (no relationship exists and does not to exist), "weak" (needs major improvement), "average" (potential of fine-tuning), and "strong" (sustain as-is).

A. CONGRUENCE BETWEEN INPUT AND THROUGHPUT FACTORS

First, congruence between inputs and throughput is evaluated to determine "To what extent do the inputs affect the throughput?"

1. Environment–Tasks/Jobs

The relationship between the environment and tasks/jobs was analyzed to determine the congruency of the factors.

a. Environment (Political)-Task/Jobs

The relationship between the Environment (Political) and Tasks/Jobs (Figure 29) is assessed as "Average."

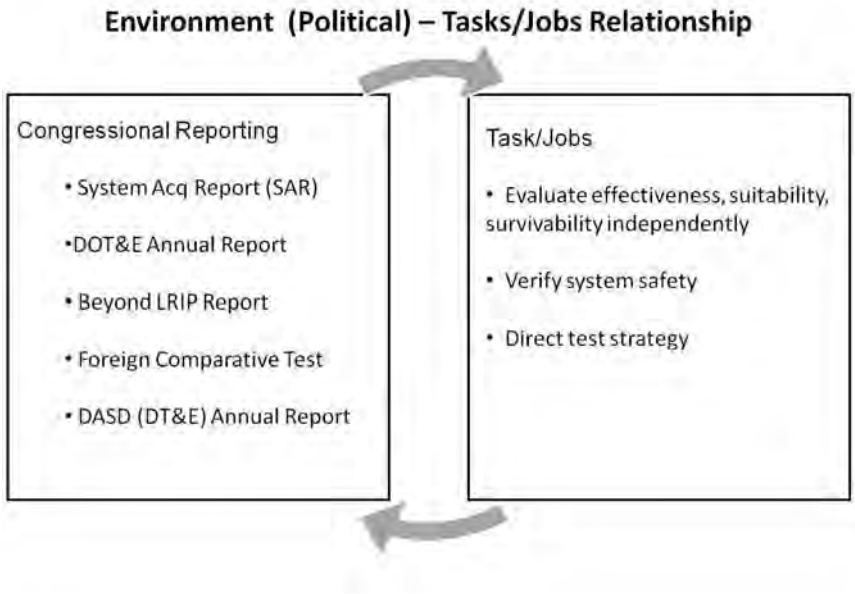


Figure 29. Environmental (Political)–Tasks-Jobs Relationship

AEC provides information included in the reports submitted to Congress. The task/jobs do support the requirements of the Congressional Reports, however, fine tuning of the supporting processes and procedures is required based on the FY13 DOT&E and DASD(DT&E) Annual Reports. The fine tuning requirements are addressed later in the paper.

b. Environment (Economic)–Task/Jobs

The relationship between budget and the tasks assigned to AEC (Figure 30) were analyzed. There is no direct relationship between the budget and the tasks assigned to AEC and therefore assessed as "NA."

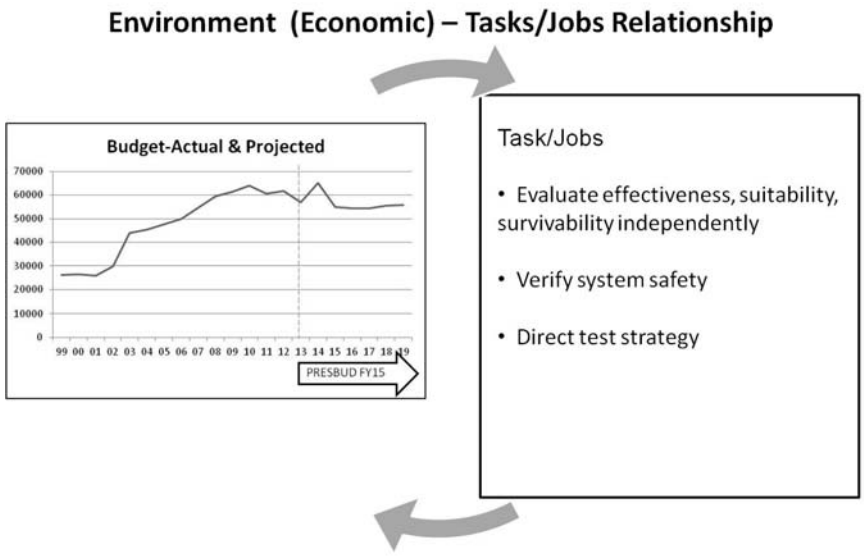


Figure 30. Environmental (Economic)–Tasks-Jobs Relationship

AEC must perform the tasks regardless of the external economics to include budget and increase of employee fringe benefit.

c. Environment (Social Pressures)–Task/Jobs

There is no relationship between the social pressures and the tasks assigned to AEC (Figure 31) and therefore assessed as "NA."

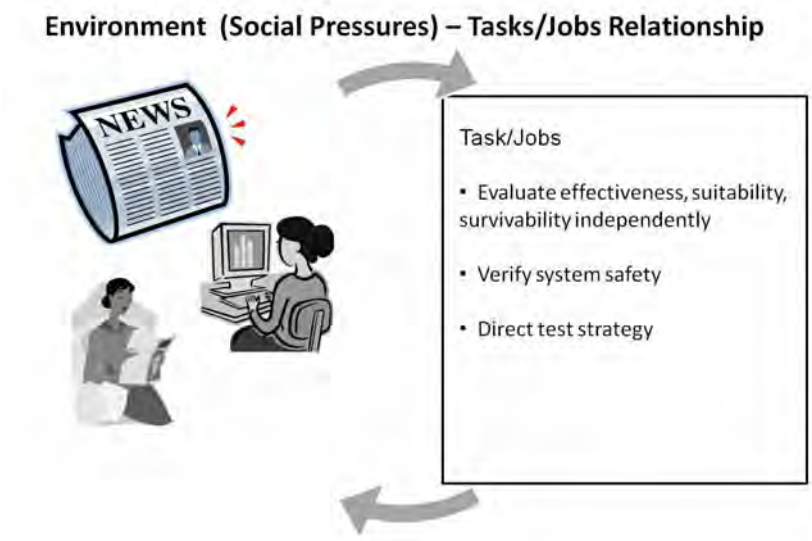


Figure 31. Environmental (Social Pressures)–Tasks-Jobs Relationship

The social pressures from the external environment do not determine the tasks/jobs AEC is required to perform.

d. Environmental (Technological)–Task/Jobs

There is no relationship between the technological factor and the tasks assigned to AEC (Figure 32) and is therefore assessed as "NA."

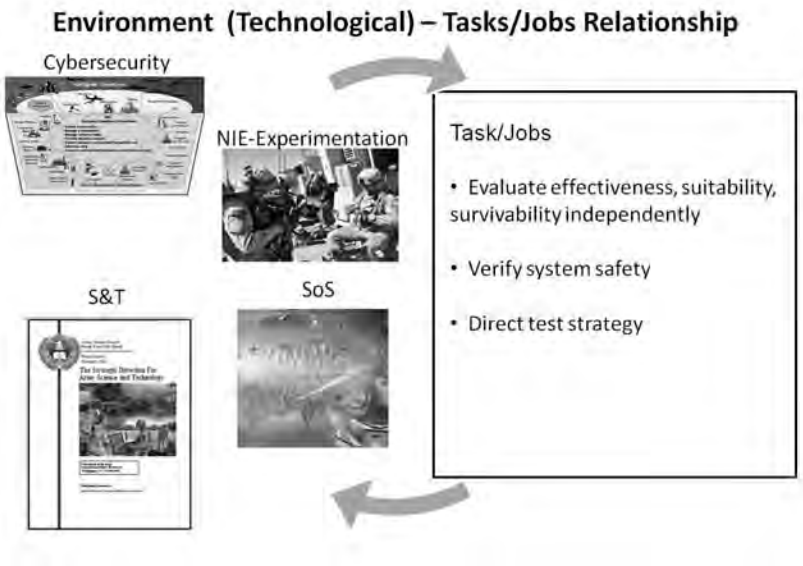


Figure 32. Environmental (Technological)–Tasks-Jobs Relationship

Although AEC may need to adjust the workflow required to execute the task/jobs, the technological aspect of the external environmental does not impact the task/jobs that AEC is directed to execute.

2. Environment-Technology

a. Political-Technology

The relationship between the environment (political) and technology (workflow) (Figure 33) was analyzed and there is a strong congruency identified.

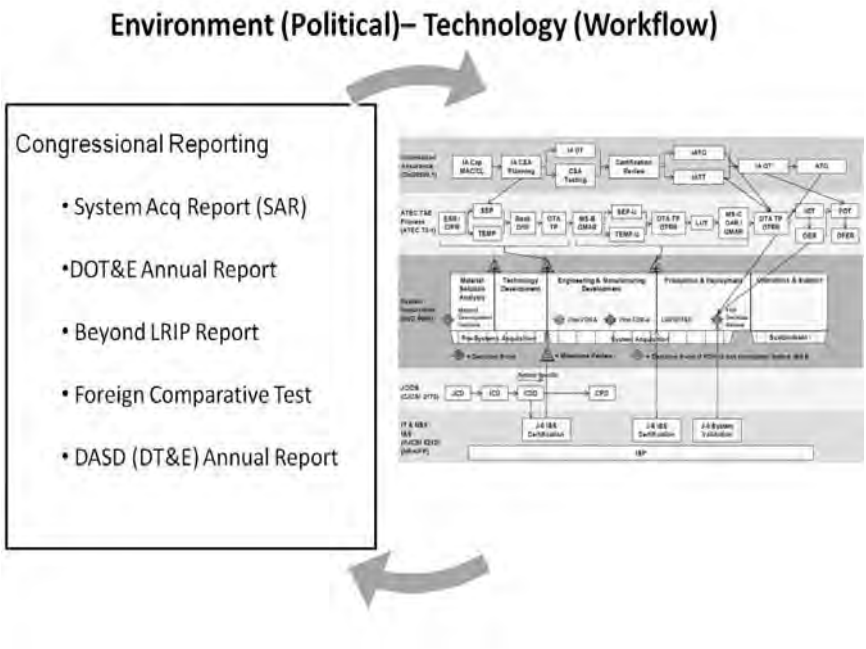


Figure 33. Environmental (Political)–Technology (Workflow)

It is assumed that AEC provides information to support the SAR that is of value as there is no evidence to support otherwise. The FY13 DOT&E Annual report discusses problem discovery affecting OT&E. The report states " Adequate developmental and operational testing are essential for determining whether systems provide an effective, suitable, and survivable warfighting capability to our Soldiers, Sailors, Airmen, and Marines." The report further states that Congress has expressed concern that problems are not found early enough to prevent cost and schedule increases or is a "fatal flaw" that cannot be fixed. DOT&E offers several solutions to mitigate this issue to include: allow adequate time for developmental testing and resolve issues found during DT; operationally focused DT; TRADOC provide earlier concept of operations and employment for better test design; improved requirements documents and contract language to include not only performance specifications, but mission capabilities. Additionally, DOT&E addressed cybersecurity vulnerabilities discovered during OT. The DASD(DT&E) Annual Report provided guidance on initiatives such as "Shift Left" which supports DOT&E's recommendations on robust DT. The findings in these reports

as well as the upcoming changes to DOD 5000.02 will cause AEC to adjust how the assigned tasks are performed.

b. Environmental (Economic)-Technology

The relationship between the economic factor and technology (workflow) (Figure 34) was analyzed and there is not a direct correlation and therefore is assessed as "NA." There are second and third order effects regarding the resourcing/manning of the workflow that are addressed later in the paper.

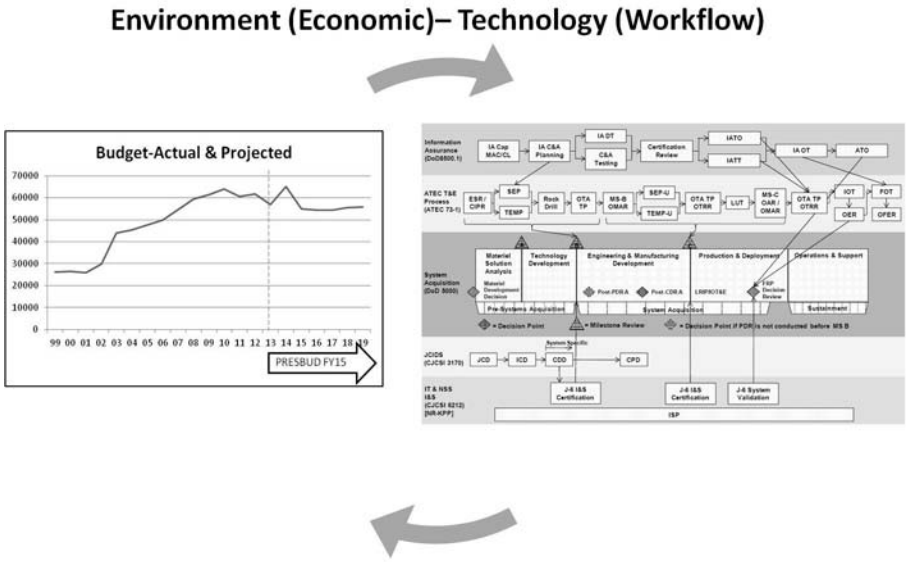


Figure 34. Environmental (Ecnomic)–Technology (Workflow)

c. Environment (Social)–Technology –

The relationship between the economic factor and technology (workflow) (Figure 35) was analyzed and there is no relationship.

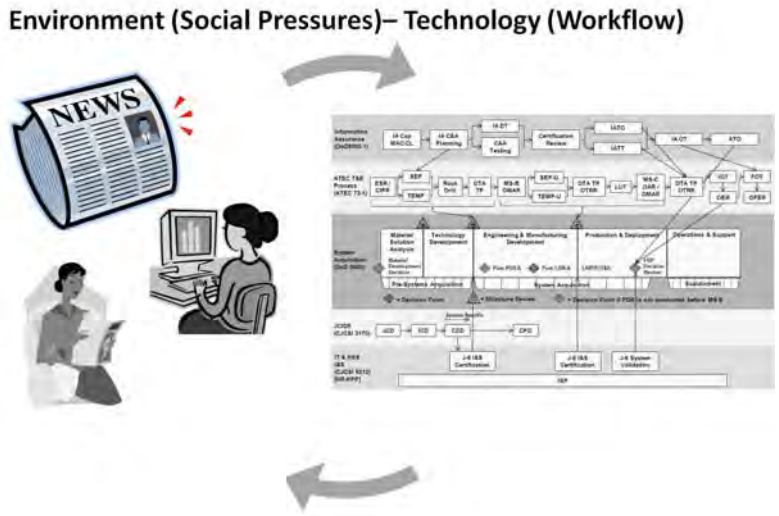


Figure 35. Environmental (Social Pressures)–Technology (Workflow)

d. Technological–Technology

The relationship between the technological factor and technology (workflow) was analyzed (Figure 36) and there is a weak congruency.

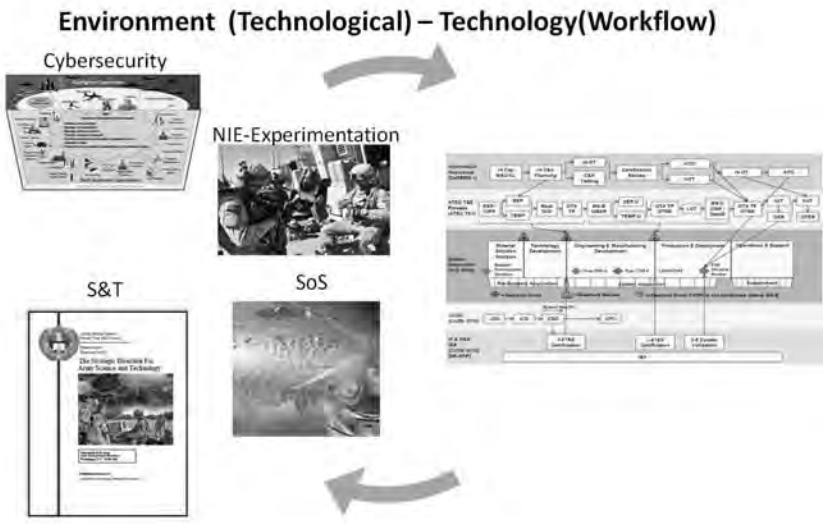


Figure 36. Environmental (Technological)–Technology (Workflow)

The increased emphasis on cybersecurity, especially in the system of system context, and support to the "Shift Left" initiative will cause more effort in earlier in the program. This increased effort will result in more information at Milestone A. The NIE and experimentation efforts cause deviations in AEC's T&E processes.

3. Environment - Structure

a. Political–Structure

The relationship between the political factor and structure was analyzed (Figure 37) and there is a strong congruency.

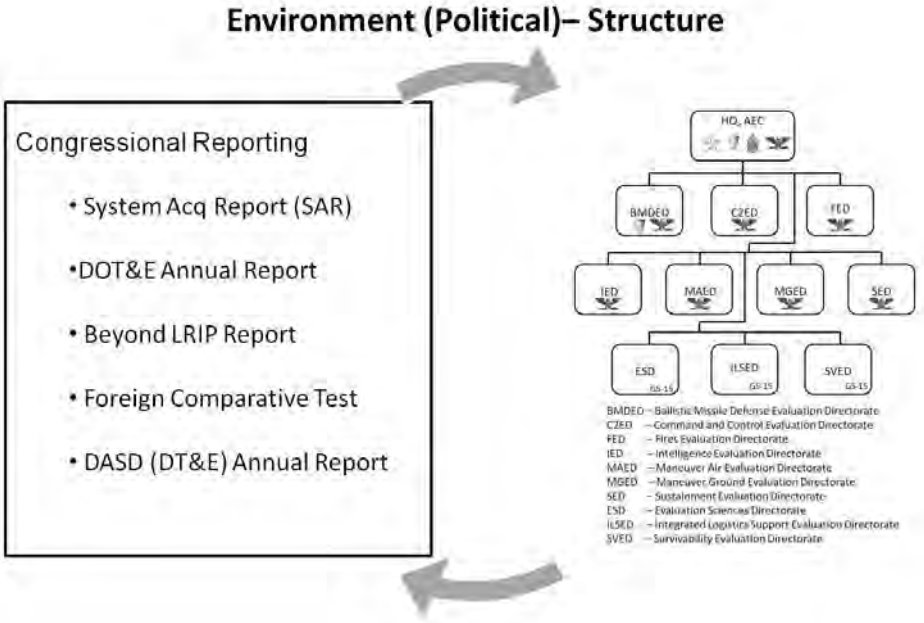


Figure 37. Environmental (Political)–Structure

AEC is structured around the Army's warfighting functions. This structure is attractive to DOT&E as it supports the operational effectiveness, suitability and survivability. DASD(T&E) is championing an effort to "operationalize" DT. The AEC structure supports that initiative as well.

b. Economic–Structure

The relationship between the political factor and structure (Figure 38) was analyzed and there is an average congruency.

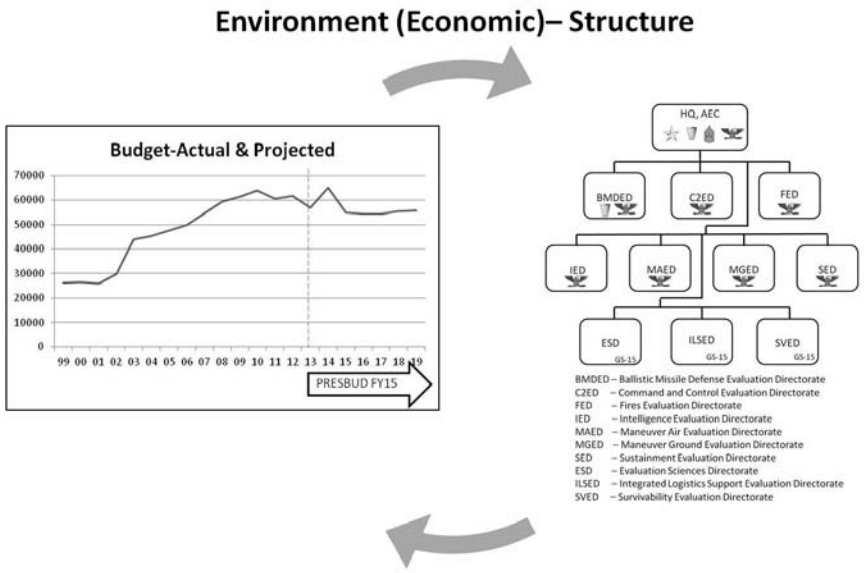


Figure 38. Environmental (Economic)–Structure

With the budgets decreasing, the structure may become too "management heavy." There may be different organizational constructs that may reduce the number of directorates and divisions to mitigate the risk resulting from the budget reductions.

c. Social Pressures– Structure

The relationship between the social pressure factor and structure (Figure 39) was analyzed and there is none. This pair is assessed as "NA."

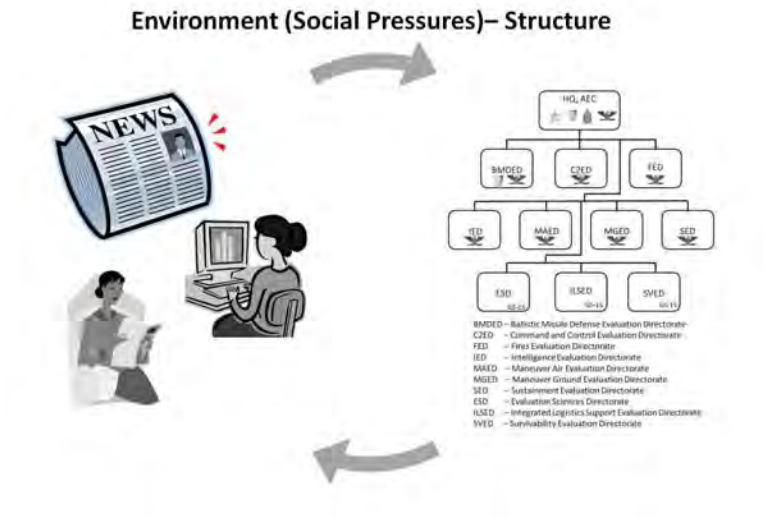


Figure 39. Environmental (Social Pressures)–Structure

d. Technological–Structure

The relationship between the technological factor and structure was analyzed (Figure 40) and there is no correlation and is assessed as "NA."

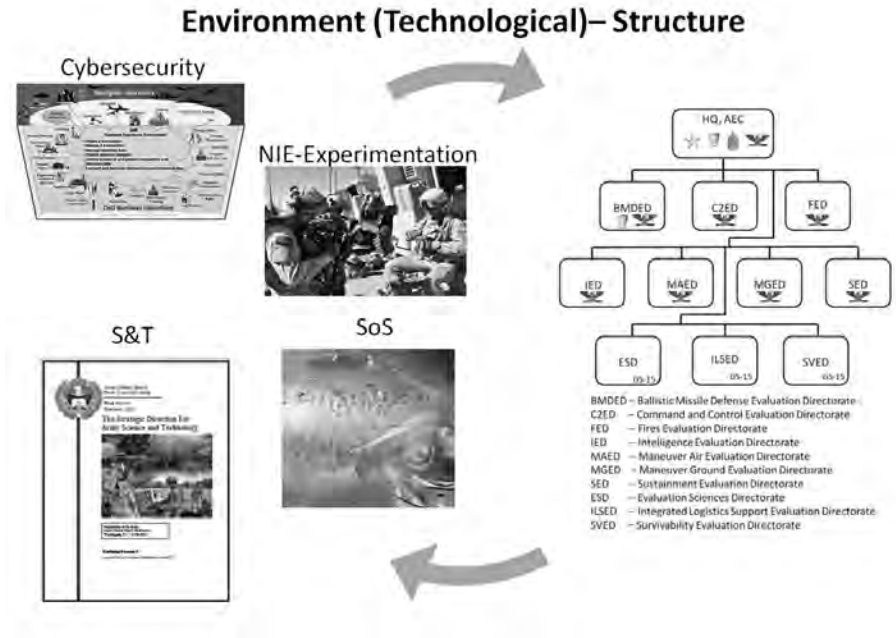


Figure 40. Environmental (Technological)–Structure

4. Environment - People

a. Political–People

The relationship between the political factor and people was analyzed (Figure 41) and there are second and third order effects regarding budget and acceptance of products; however there is not a direct relationship and therefore assessed as "NA."

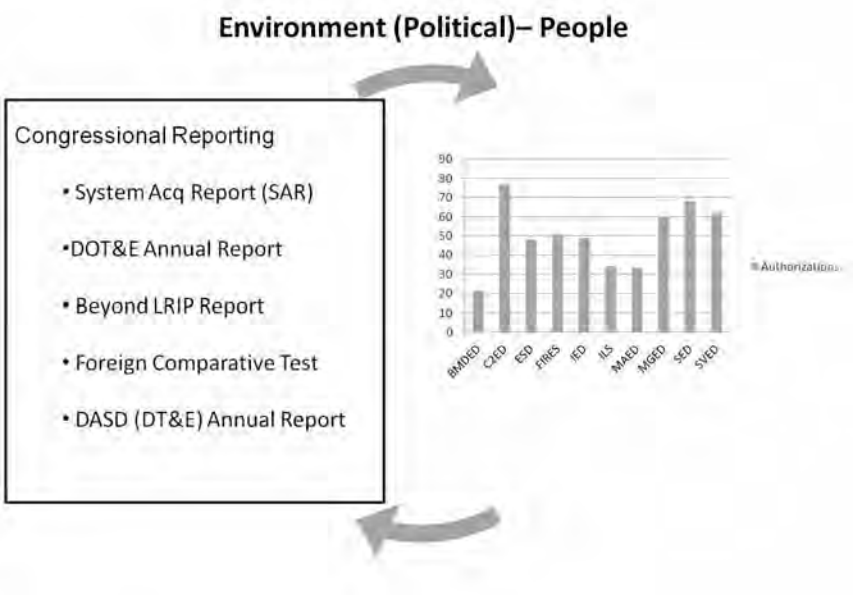


Figure 41. Environmental (Political)–People

b. Economic–People

The relationship between the economic factor and people was analyzed (Figure 42) and there is congruency and assessed as "Average."

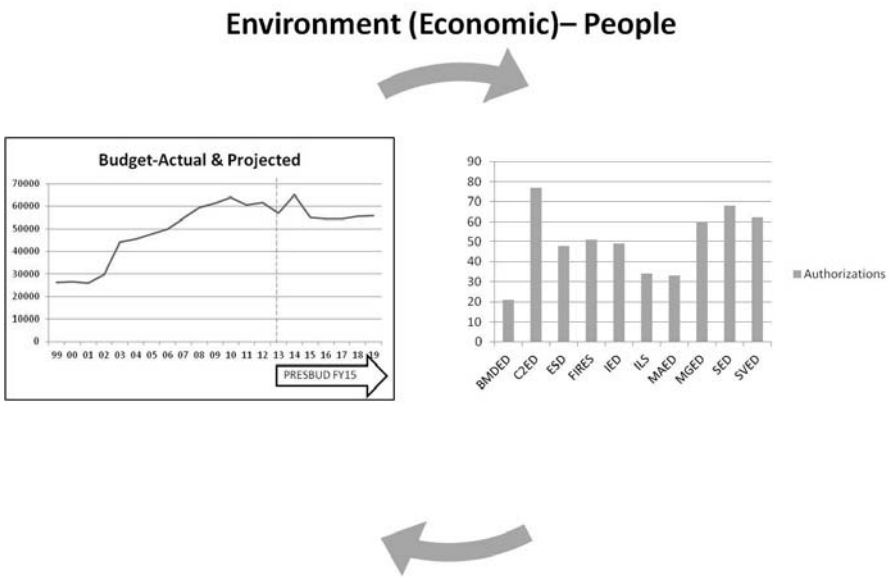


Figure 42. Environmental (Economic)–People

Most Department of Defense civilians, to include AEC, were furloughed for 11 days between July and September 2013, placing employees in a temporary non-duty, non-pay status because of lack of funds. This represents a 20 percent reduction in pay during that period. Major budgetary shortfalls drove the basic furlough decision.

DOD Civilian Personnel Fringe Benefits cost continue to increase. The benefit cost is combined with the civilian labor costs and paid for by AEC. As the benefit cost increases, there is more of a demand on the budget. Civilian salaries will have limited increases.

As the budget and authorizations continue to drawdown, AEC will need to closely continue to manage hiring actions to balance authorization and workload.

c. Social Pressures–People

The relationship between the social pressures and people was analyzed (Figure 43) and there is no correlation and therefore assessed as “NA.”

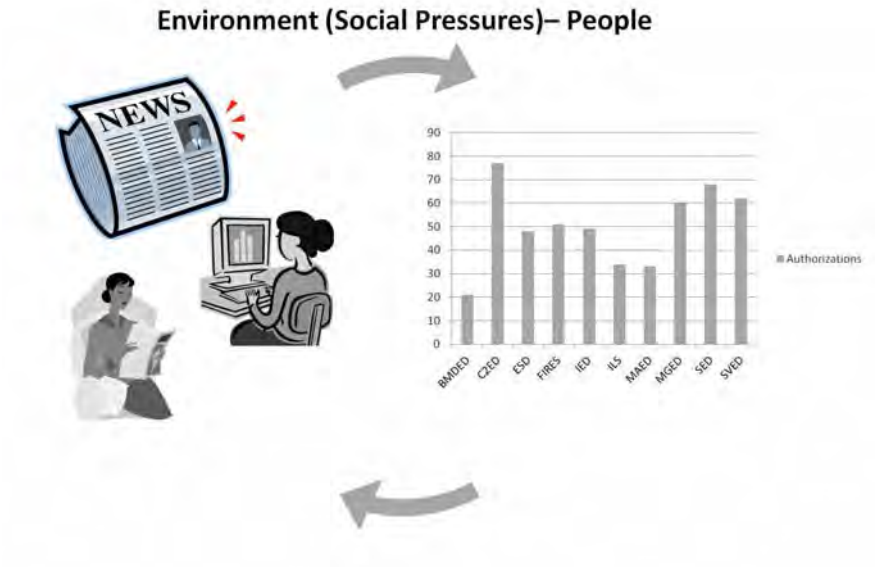


Figure 43. Environment (Social Pressures)–People Relationship

Social pressures may impact the DOD and Army levels, which will then impact AEC. However, AEC ‘s people (manpower authorizations and the on-board personnel) are not impacted by social pressures.

d. Technological–People

The relationship between the technological factor and people was analyzed (Figure 44) and there is an average congruency and therefore assessed as “Average.”

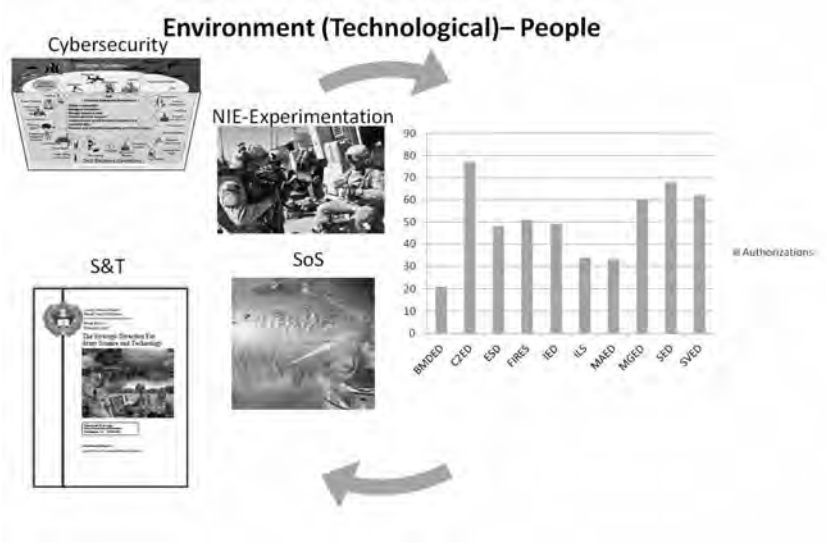


Figure 44. Environment (Technological)-People Relationship

AEC will need to closely continue to manage hiring actions to balance authorization with the new skill mix required for future missions resulting from technologies emerging from Army Science and Technology. Additionally, as the cybersecurity mission matures, AEC may need additional expertise and an increase of authorizations for military and civilian.

5. Environment–Process/Subsystems

The relationship between the environmental factors and process/subsystems was analyzed.

a. Political–Process/Subsystems

The relationship between the environmental (political) factor and process/subsystems (Figure 45) was analyzed and assessed as a strong congruency due the heavily regulated processes supporting financial and human resource management. ATEC provided additional guidance in acquisition and contracting by emplacing policy to mitigate conflict of interest.

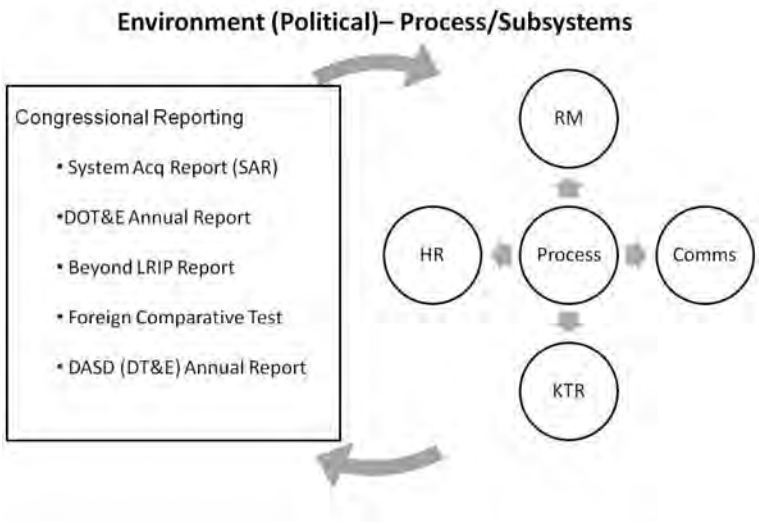


Figure 45. Environment (Political)-Process/Subsystems Relationship

The cost of the AEC civilian workforce labor is direct funded (not customer/Program Manager reimbursed). AEC currently uses contractors to augment the current civilian and military workforce; the products provided are not the conclusions of the final evaluation product but may include data reduction and analysis, data bases (and management) and data produced by models and simulations. The efforts performed by contractors are 100% reimbursed by the customer. AEC civilian and military personnel provide technical and administrative oversight and control of all contractor efforts. This oversight and control function is inherently governmental and is not appropriate for contractors to perform.

Title 10 §2399 states the Director of Operational Test and Evaluation of the Department of Defense approves (in writing) the adequacy of the plans (including the projected level of funding) for operational test and evaluation to be conducted in connection with that program. Title 10 further states the Director shall prepare a report stating his opinion whether the test and evaluation performed were adequate; whether the results of such test and evaluation confirm that the items or components actually tested are effective and suitable for combat; and additional information on the operational capabilities of the items or components that the Director considers appropriate based on the testing conducted.

There is no relationship between environmental (political) and communications, information, planning and decision making.

b. Economic–Process/Subsystems

The relationship between the environmental (economic) factor and process/subsystems (Figure 46) was analyzed and there is average congruency.

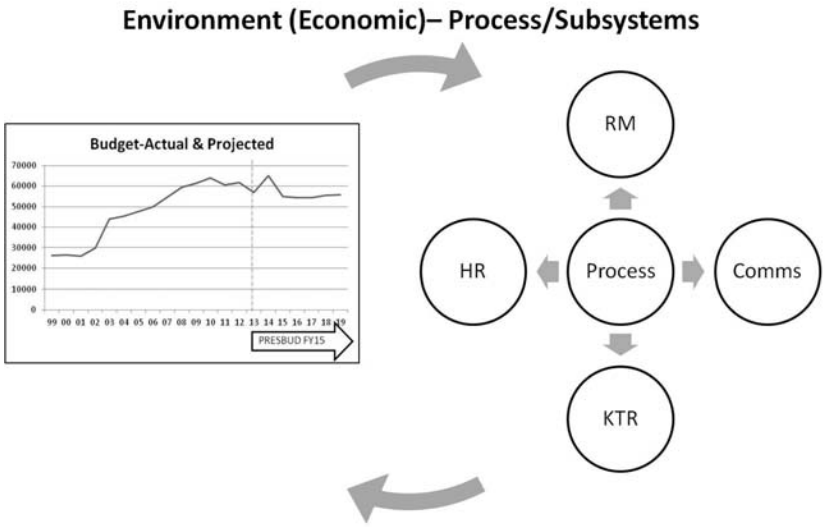


Figure 46. Environment (Economic)-Process/Subsystems Relationship

As budgets decrease, the demand on the resources increases. This results in additional reporting and more detailed tracking of budgets. Human resource management processes are stressed as AEC manages workforce reshaping by offering VERA-VSIP and other tools. Communications become more important to ensure the workforce is informed of resource decisions so they can plan for their futures. Planning and decision-making processes value increases as the decisions made will have lasting effect on the mission and the workforce.

c. Social–Process/Subsystems

The relationship between the environmental (social pressures) factor and process/subsystems (Figure 47) was analyzed and there is weak congruency due to the communications process/subsystems.

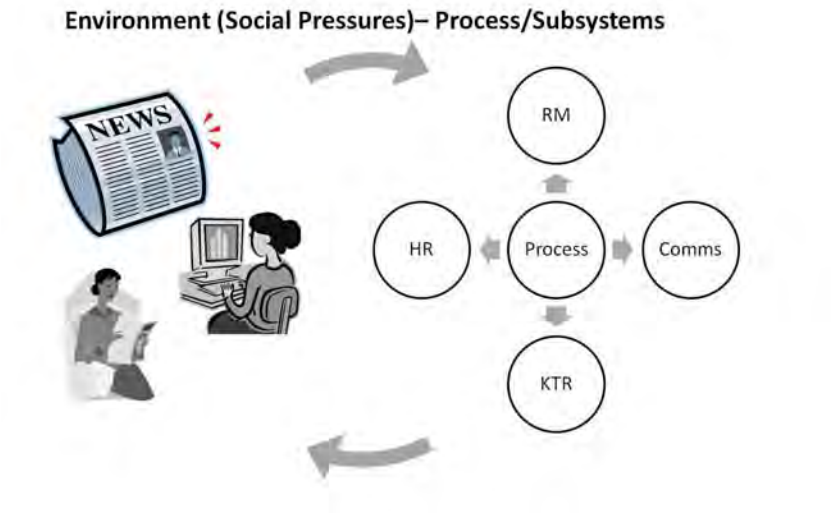


Figure 47. Environment (Social Pressures)–Process/Subsystems Relationship

The heavily regulated processes of Resource Management, Human Resources and Acquisition & Contracting are not influenced by social pressures at the AEC level. These processes may be influenced at the DOD and Army levels, which will eventually modify the processes within AEC and ATEC. Social pressures may put an additional demand on the communications processes as shown with the Palantir situation to ensure the AEC workforce is informed on the processes and procedures for speaking with the media.

d. Technological–Process/Subsystems

The relationship between the environmental (technological) factor and process/subsystems (Figure 48) was analyzed and there is no correlation and therefore assessed as "NA."

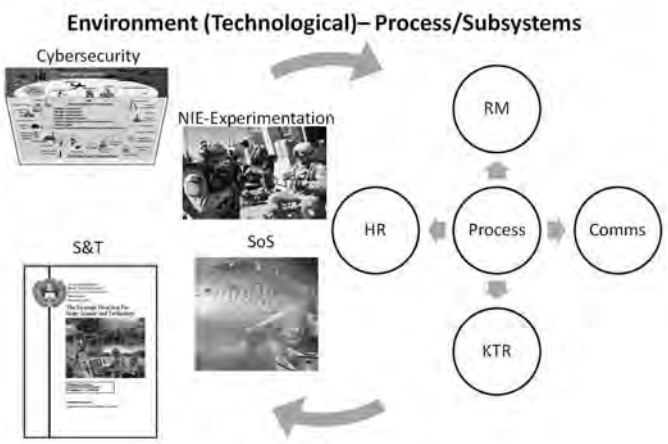


Figure 48. Environment (Technological)–Process/Subsystems Relationship

6. Key Success Factors-Task/Jobs

The relationship between the Key Success Factors and Task/Jobs (Figure 49) was analyzed and there is a strong congruency.

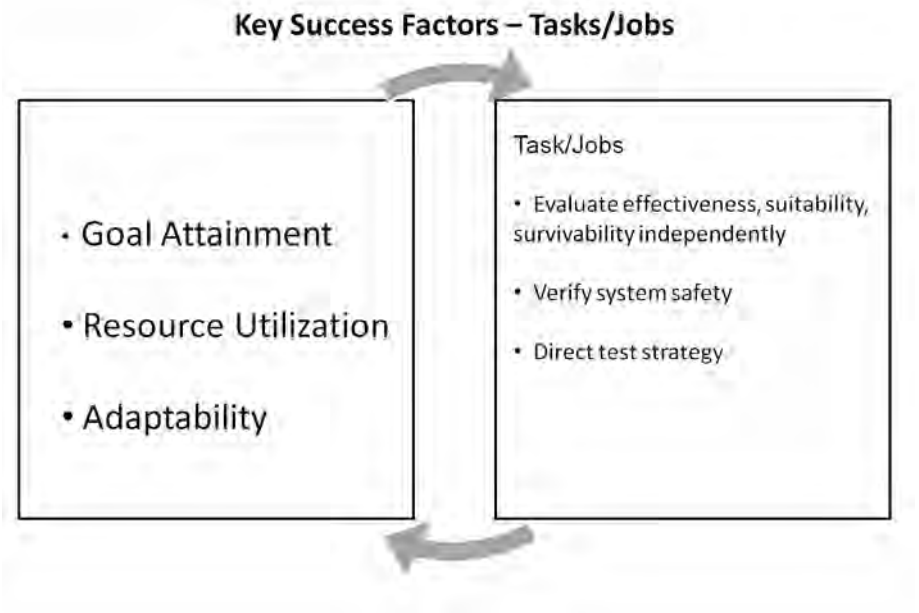


Figure 49. Key Success Factors-Task/Jobs

The AEC Strategic Plan Goal 2: "Continue to Improve Product Value to our Customers" focuses on improving the value of AEC products to the decision-makers.

Initiatives are built to support this goal with metrics to assess progress towards attaining the goal.

7. Key Success Factors–Technology

The relationship between the Key Success Factors and Task/Jobs (Figure 50) was analyzed and there is a strong congruency.

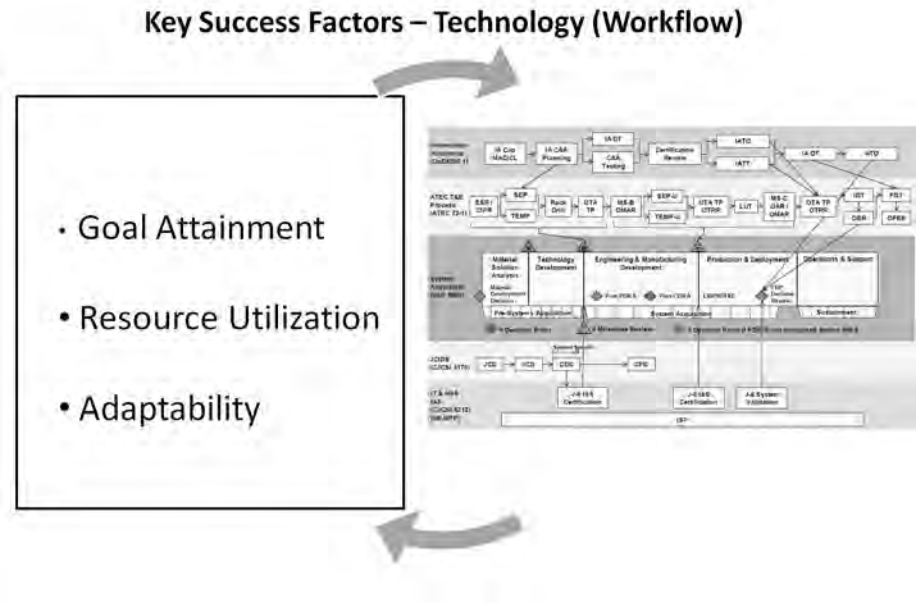


Figure 50. Key Success Factors–Technology (Workforce) Relationship

The AEC Strategic Plan Goal 2: "Continue to Improve Product Value to our Customers" focuses on improving the value of AEC products to the decision-makers. Initiatives are built to support this goal with metrics to assess progress towards attaining the goal. Additionally, AEC Strategic Plan Goal 3: Ensure the organization is structured for efficient operations supports the resource utilization and adaptability factors.

8. Key Success Factors–Structure

The relationship between the Key Success Factors and Structure (Figure 51) was analyzed and there is an average congruency assessment. The actual structure of AEC does impact goal attainment and resource utilization. The current structure is composed

of 10 directorates with 46 divisions. With the reductions to budget, the number of directorates and divisions may decrease resulting in less management and more manpower performing the work. This supports all three key success factors. Goal 3 of the AEC Strategic Plan focuses on efficient operations and includes an objective "Creating a flexible organization to respond to changing workload environment"

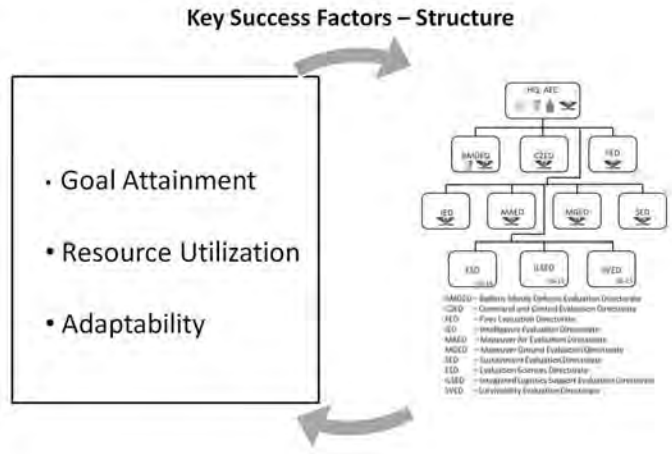


Figure 51. Key Success Factors–Structure Relationship

9. Key Success Factors–People

The relationship between the Key Success Factors and People (Figure 52) was analyzed and there is strong congruency.

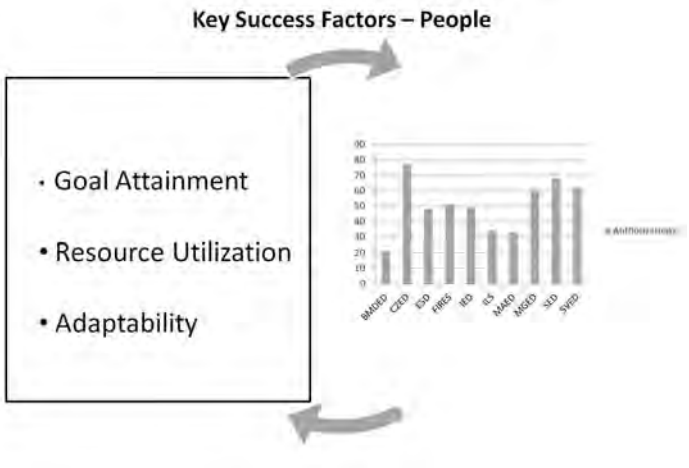


Figure 52. Key Success Factors–People Relationship

The People factor is strongly related to Goal Attainment, Resource Utilization and Adaptability. The main thrust of Goal 1 is centered on the AEC workforce. The goal states "Organization that is a Great Place to Work" with objectives of "Maintain an Organization of Talented Professionals"; "Raise Workforce Credentials and Certifications"; "Ensure good communications and transparency"; "Increase team work"; and "Improve workforce quality of life affect the AEC workforce."

10. Key Success Factors–Process/Subsystems

The relationship between the Key Success Factors and Process/Subsystems (Figure 53) was analyzed and the congruency is assessed as "Average."

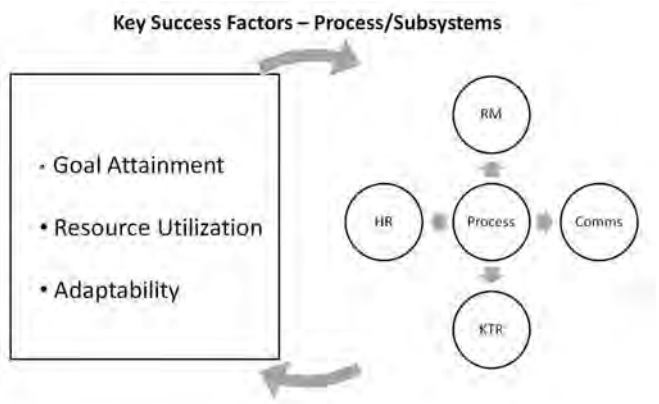


Figure 53. Key Success Factors–Process/Subsystems Relationship

AEC's Strategic Plan third objective focuses on the organization's operations. The processes of Resource Management and Human Resources are impacted. Currently processes with the ATEC staff will need to be "smoothed." Ad-hoc and unstable processes cause inefficiency as the interfaces between AEC and ATEC HQ are not well defined. Additionally, no documented process exists to reassign resources (military and civilian manpower) to balance workload.

11. System Direction-Task/Jobs

The relationship between the System Direction and Process/Subsystems (Figure 54) was analyzed and there is strong congruency.

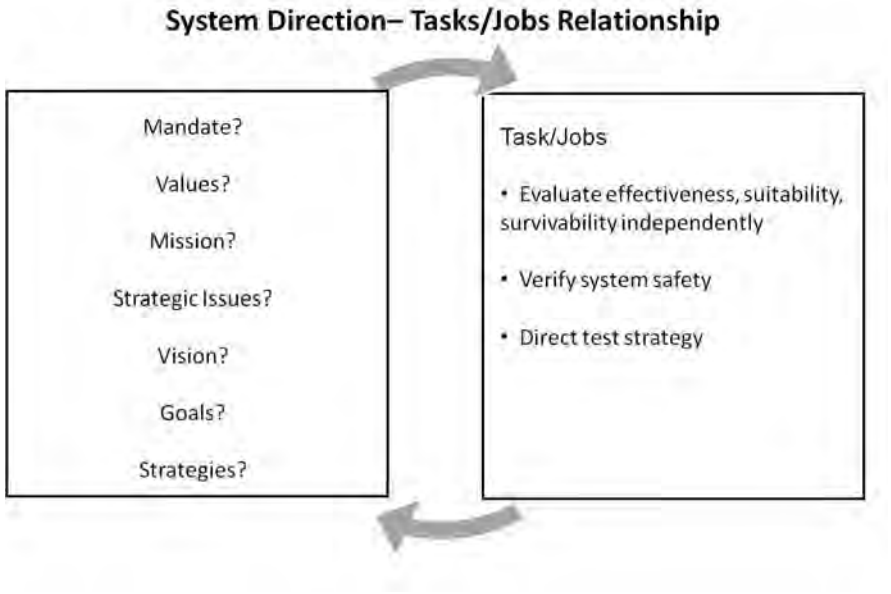


Figure 54. System Direction–Tasks/Jobs Relationship

As described in earlier sections, the AEC mission is derived from the mandates and the tasks/jobs are derived from the mission. There is a strong linkage between the system direction and the tasks/jobs. The Army Values provide the foundation for the leadership required to perform the tasks/jobs. AEC Strategic Plan goals and objectives support continuous improvement (effectiveness and efficiency) of the tasks/jobs defined. The AEC vision statement incorporates the system direction and the tasks/jobs.

12. System Direction-Technology

The relationship between the System Direction and Technology (Figure 55) was analyzed and there is strong congruency.

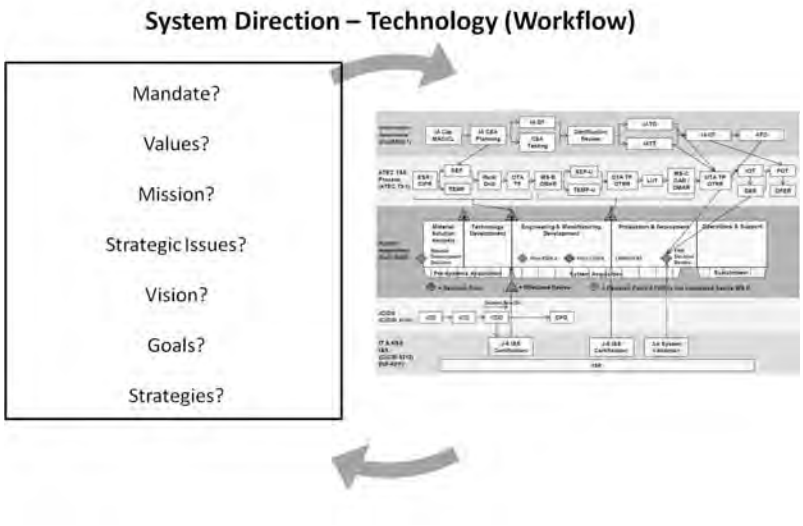


Figure 55. System Direction Factors–Technology (Workforce) Relationship

There is a strong linkage between the system direction and the workflow. The Army Values provide the foundation for the leadership required to execute the workflow. AEC Strategic Plan goals and objectives support continuous improvement (effectiveness and efficiency) of the workflow defined. The AEC vision statement incorporates the system direction and the best practices required to have an efficient and effective workflow.

13. System Direction-Structure

The relationship between the System Direction and the Structure (Figure 56) was analyzed and there is average congruency.

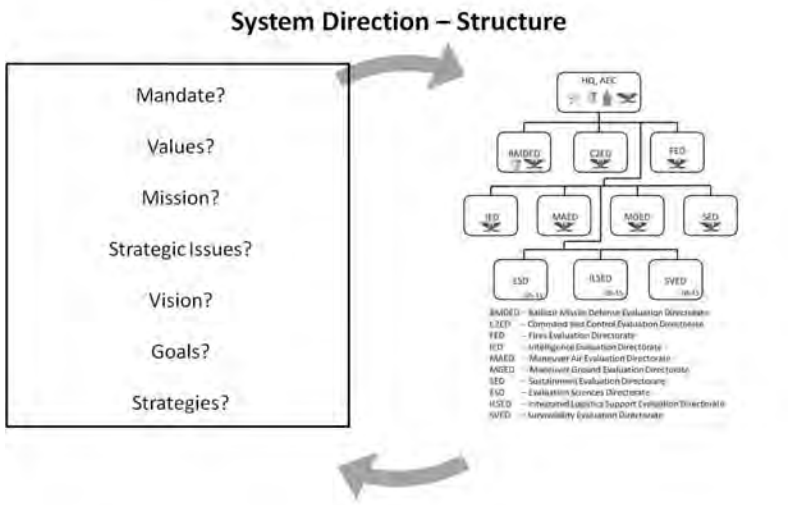


Figure 56. System Direction–Structure Relationship

The mandates direct that AEC provide evaluations focusing on the operational effectiveness, suitability and survivability. AEC's structure is almost perfectly aligned to support the mandates. The directorates of C2ED, FED, IED, MAED, MGED and SED focus on the effectiveness of the weapon systems assigned. SVED focuses on the survivability evaluations. ESD and ILS perform the suitability evaluations. AEC may consider consolidating ESD (RAM) and ILS to support the integrated suitability evaluation required by the mandates.

14. System Direction-People

The relationship between the System Direction and People (Figure 57) was analyzed and there is average congruency.

Figure 57. System Direction–People Relationship

The mandates direct the initiatives such as increased cybersecurity during DT, use DoE on all ACAT I programs and integrate suitability (operationalize RAM using the ILS as the mechanism). This drives AEC to analyze the current skills on-board and determine the gaps in the on-board strengths. This gap analysis will drive recruitment strategies and/or training plans.

The ATEC-mandated Control Points currently support affordability of the AEC workforce, however, in some positions, the workforce would benefit from the General Service (GS) system. For example, an NH-04 is a GS-14 equivalent. The salary opportunity for the NH-04 would be $129,519 as a GS employee instead of capped at $110,734.

15. System Direction-Process/Subsystems

The relationship between the System Direction and Process/Subsystems (Figure 58) was analyzed and there is strong congruency.

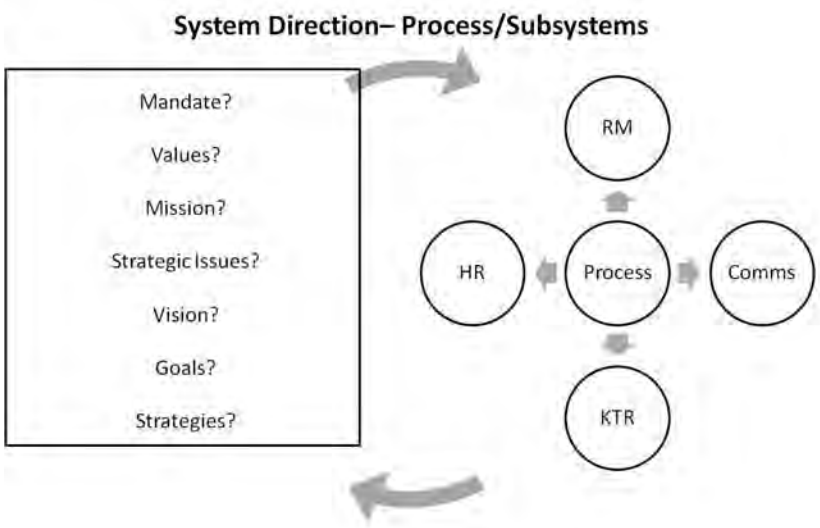


Figure 58. System Direction–Process/Subsystems Relationship

The system direction impacts the process/subsystems of Financial Management, Measurements and Controls by directing a strong management internal control program. AEC receives most of the staff services from ATEC HQ. ATEC HQ has a robust MICP, for their staff processes; however AEC does not have a formal program for their internal processes. AEC's internal processes are currently inconsistent and ad-hoc. Documented, standardized, consistent, efficient, effective, enforced, and streamlined processes are required to ensure effective and efficient operations.

The Human Resource Management process/subsystem is impacted by the mandates, goals and strategies. The HR dimension is heavily regulated in the federal government, and therefore there is very little flexibility in the recruitment, selection, rotation, promotion or termination of the workforce. Retirement is an individual's option, there is no mandatory retirement age in federal service.

The ATEC Policy Bulletin 2–11, Organizational Conflicts of Interest (OCI) Involving Contractors in Support of ATEC Test and Evaluation (T&E) implements policy and procedures to ensure the avoiding violations of Title 10, United States Code, Section 2399(d).

Organizations should communicate their values and the behavioral expectations that go along with those values to their employees. AEC's communications processes are not as robust as they could be in today's world of social media. AEC's geographically dispersed lay-out causes gaps in the current communication processes.

16. Summary of Congruence between Input and Throughput Factors

Table 20 shows the summary of congruence between input and throughput factors that determine the extent of input factors affecting throughput factors.

Design Factors	Task/Jobs	Technology	Structure	People	Process/ Subsystem
Environment (Political)	Average	Strong	Strong	NA	Strong
Environment (Economic)	NA	NA	Average	Average	Average
Environment (Social)	NA	NA	NA	NA	Weak
Environment (Technological)	NA	Weak	NA	Average	NA
Key Success Factors	Strong	Strong	Average	Strong	Average
System Direction	Strong	Strong	Average	Average	Strong

Table 20. Summary of Congruence of Input-Throughput Factors

The areas for improvement for the throughputs in relation to the inputs are those assessed as "Weak" and "Average." Areas assessed as "weak" are targets of improvement; those areas assessed as "Average" may require fine-tuning. Findings and recommendations for improvement are addressed in Chapter V.

B. CONGRUENCE OF THROUGHPUT FACTORS

A key underlying factor of the OSF model is that organizations possess a greater ability to control factors within the throughput as opposed to inputs or results. Congruence among the throughput factors is evaluated to determine "To what extent do the throughput factors affect each other?"

1. Tasks/Jobs–Technology

The relationship between the Tasks/Jobs and Technology (Figure 59) was analyzed and there is strong congruency.

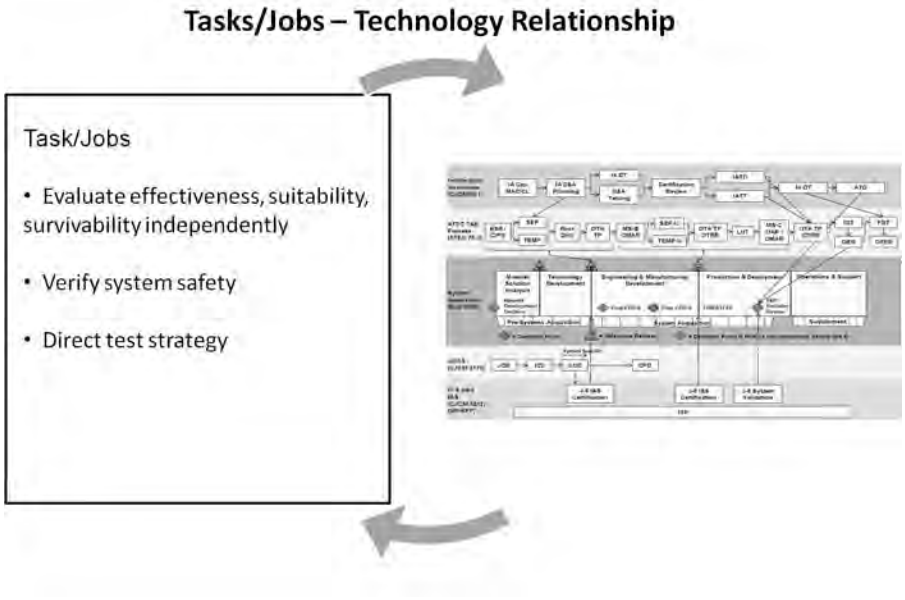


Figure 59. Task/Jobs–Technology Relationship

Purposely, the workflow does align strongly to the tasks/jobs. There may be fine-tuning of the workflow as the changes to the DOD 5000.02 are published.

2. Tasks/Jobs–Structure

The relationship between the Tasks/Jobs and Structure (Figure 60) was analyzed and there is strong congruency. The organization is structured to support effectiveness, suitability and survivability. System safety and directing test strategy are executed by subject matter experts assigned to each effectiveness directorate.

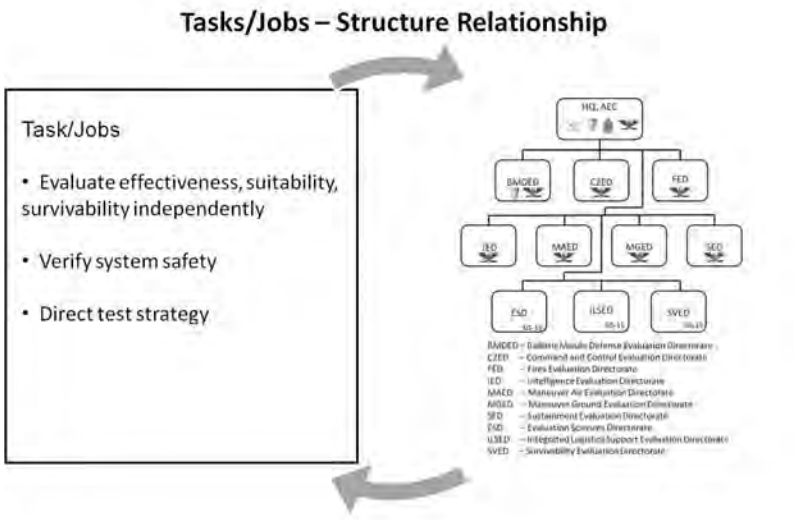


Figure 60. Tasks/Jobs–Structure Relationship

3. Task/Jobs-People

The relationship between the Tasks/Jobs and People (Figure 61) was analyzed and there is a strong congruency. The current manning for each directorate appears to be adequate to execute AEC's assigned tasks.

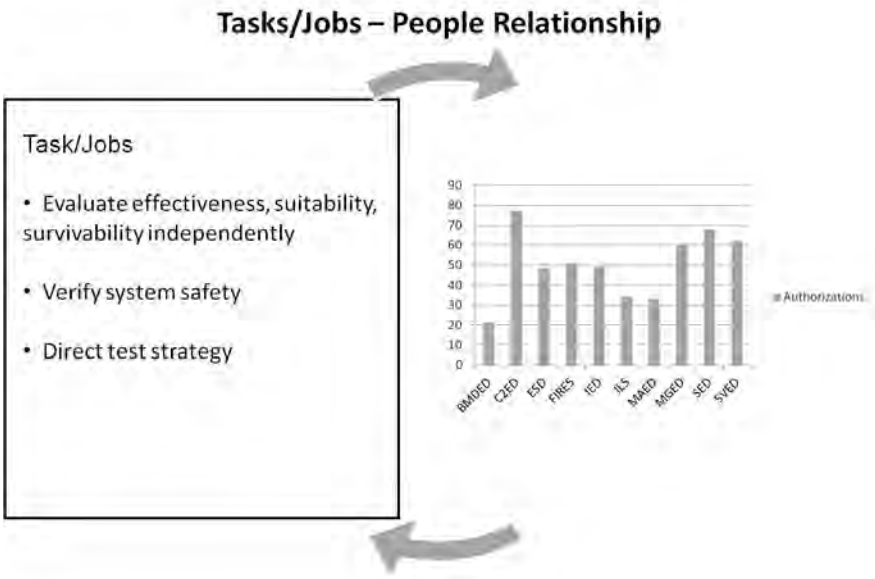


Figure 61. Tasks/Jobs–People Relationship

The knowledge, skills and abilities of the AEC workforce are aligned to the mission. There is fine-tuning of certain skill sets as the weapon systems become more complex and software driven. However, AEC skill set to perform the tasks/jobs is aligned.

4. Task/Jobs-Process/Subsystems

The relationship between the Tasks/Jobs and Process/Subsystem (Figure 62) was analyzed and there is strong congruency. ATEC HQ as the servicing staff supports AEC with adequate resource management, human resource management and contracting management support. One area that may need improvement is communications in terms of public affairs.

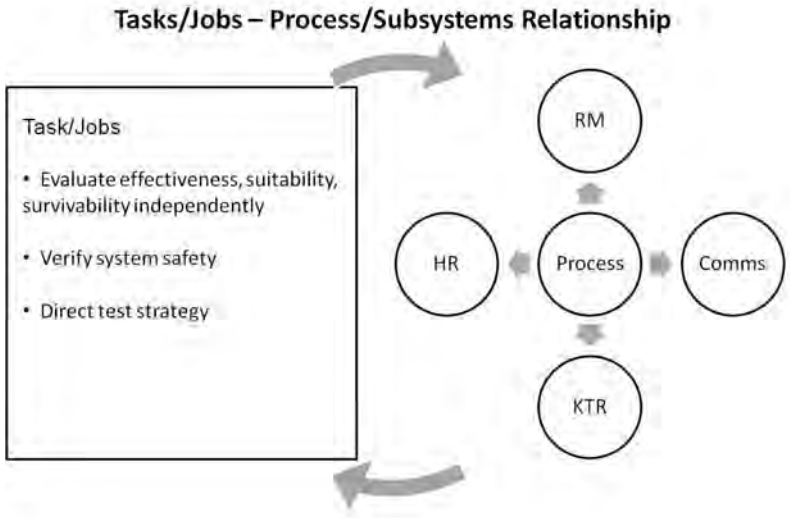


Figure 62. Tasks/Jobs–Process/Subsystems Relationship

5. Technology–Structure

The relationship between the Technology and Structure (Figure 63) was analyzed and there is an average congruency. The current structure was purposely designed to execute the T&E processes, however the ATEC HQ servicing staff concept was not in place at the time of design.

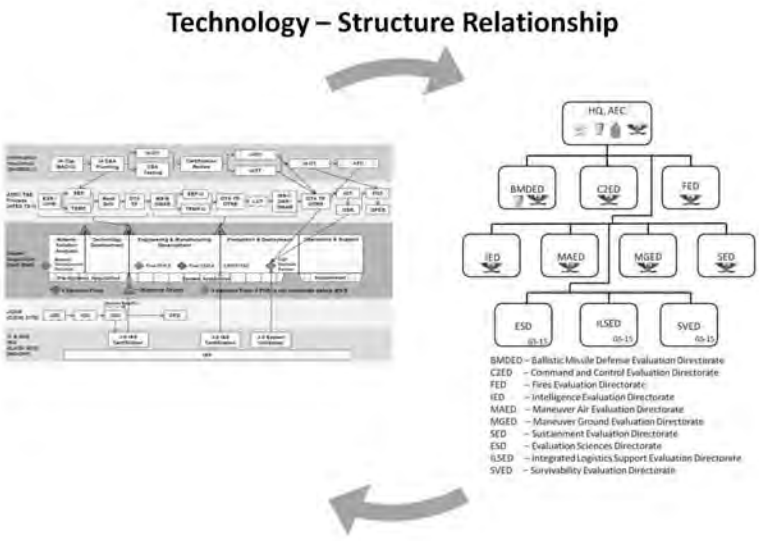


Figure 63. Technology–Structure Relationship

An example of the incongruent factors between the T&E process and the current structure is the tasking process. ATEC HQ Directorates task AEC directorates without going through an operations cell. Up to eleven (11) separate mission analyses are completed to determine if task should be executed by AEC. This workflow results in

- inconsistent processes for obtaining an AEC HQ position and sometimes omitting AEC HQ from the decision-making process
- occurrences of duplicative tasks from the ATEC HQ staff
- no reuse of information from prior tasks

6. Technology-People

The relationship between the Technology and People (Figure 64) was analyzed and there is strong congruency.

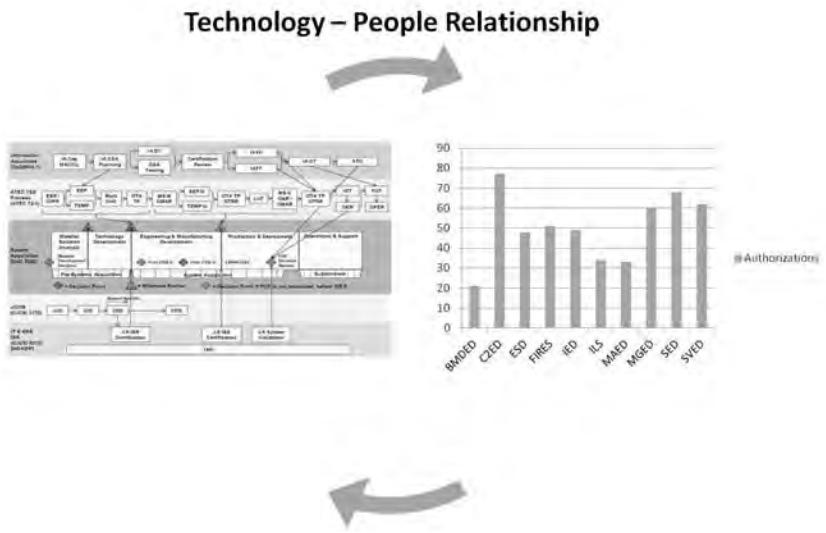


Figure 64. Technology–People Relationship

The T&E processes are supported by the current workforce.

7. Technology–Process/Subsystems

The relationship between the Technology and Process/Subsystems (Figure 65) was analyzed and there is strong congruency. ATEC HQ provides staff services to AEC that support the workflow.

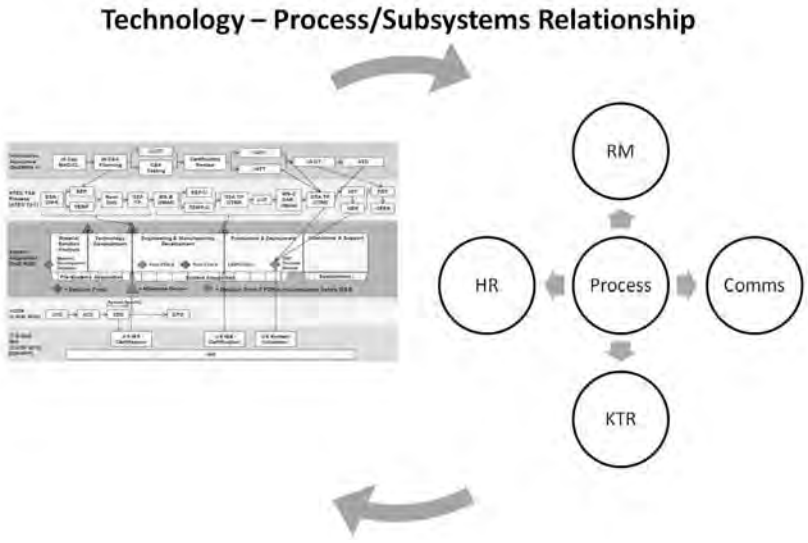


Figure 65. Technology–Process/Subsystems Relationship

8. Structure-People

The relationship between the Structure and People (Figure 66) was analyzed and there is strong congruency.

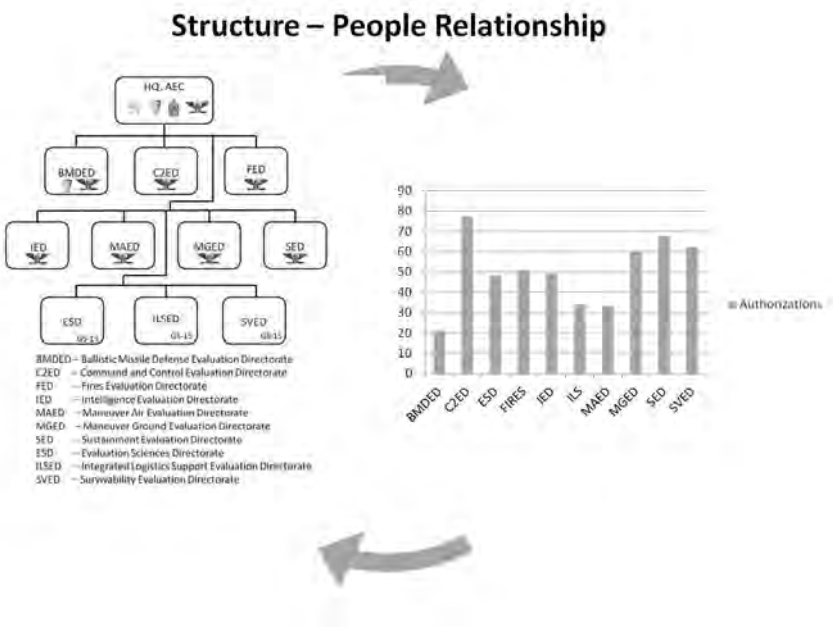


Figure 66. Structure–People Relationships

9. Structure–Process/Subsystems

The relationship between the Structure and Process/Subsystems (Figure 67) was analyzed and there is strong congruency. ATEC's servicing staff processes remain stable regardless of AEC structure, due to the highly regulated nature of the processes.

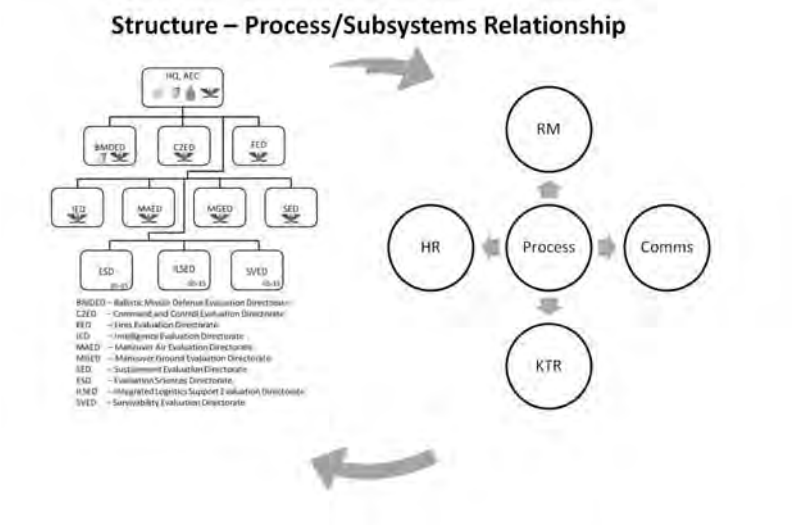


Figure 67. Structure–Process/Subsystems Relationship

10. People-Process/Subsystems

The relationship between the People and Process/Subsystems (Figure 68) was analyzed and there is strong congruency.

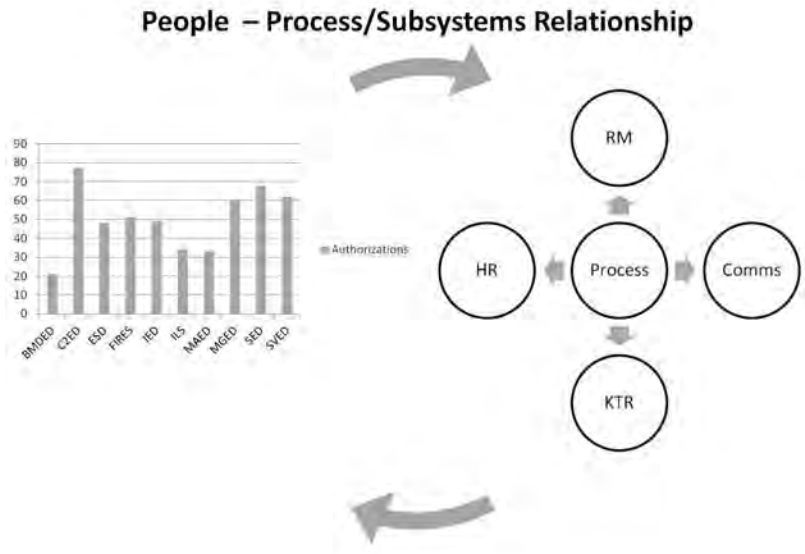


Figure 68. People–Process/Subsystems Relationship

11. Summary of Congruence of Throughput Factors

Table 21 shows the summary of congruence between the throughput factors that determine the extent of the throughput factors affecting each other.

Design Factors	Task/Jobs	Technology	Structure	People	Process/ Subsystems
Task/Jobs		Strong	Strong	Strong	Strong
Technology	Strong		Average	Average	Strong
Structure	Strong	Average		Strong	Average
People	Strong	Average	Strong		Strong
Process/ Subsystems	Strong	Strong	Average	Strong	

Table 21. Summary of Congruence of Throughput Factors

The primary areas for fine-tuning of the throughput factors where congruency is assessed as "Average." Findings and recommendations are addressed in Chapter V.

C. CONGRUENCE OF THROUGHPUT FACTORS AND RESULTS

While the inputs outline strategic direction and the design factors describe the structure and the implementation of strategy, results are a way to evaluate the success of the fit of these variables in regards to achieving the goals. The results can best be characterized by defining the outputs, or measurement of the organization's performance as well as the outcomes, or consequences of the congruence of the variables, both intended and unintended. Inputs are transformed to results through the Throughput or design factors. To answer the question "To what extent do the throughput factors affect the results?" each design factor was compared to the result to determine level of congruence.

1. Tasks/Jobs-Culture

The relationship between the Task/Jobs and Culture (Figure 69) was analyzed and there is no relationship and therefore is assessed as "NA."

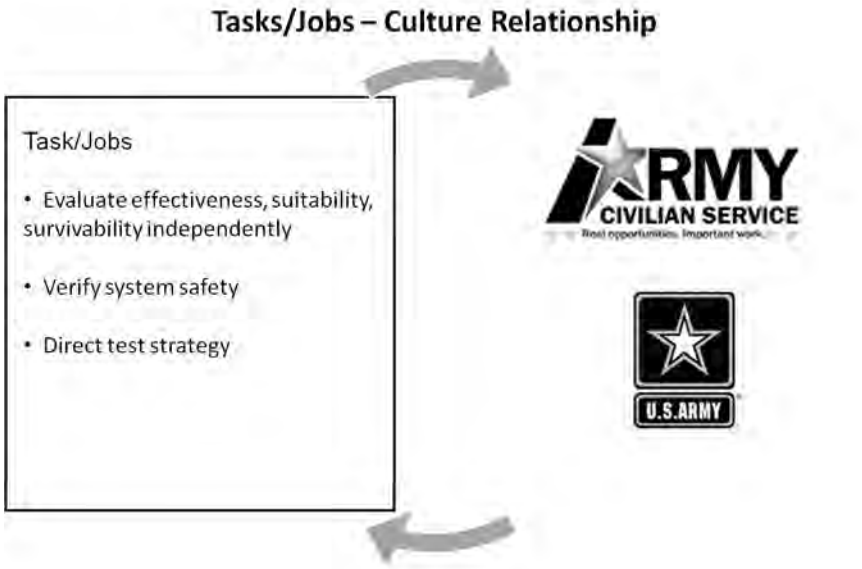


Figure 69. Tasks/Jobs–Culture Relationship

2. Tasks/Jobs-Output

The relationship between the Task/Jobs and Output (Figure 70) was analyzed and there is strong congruency. However, AEC produces numerous products with the same information; only the document name and the document format differ.

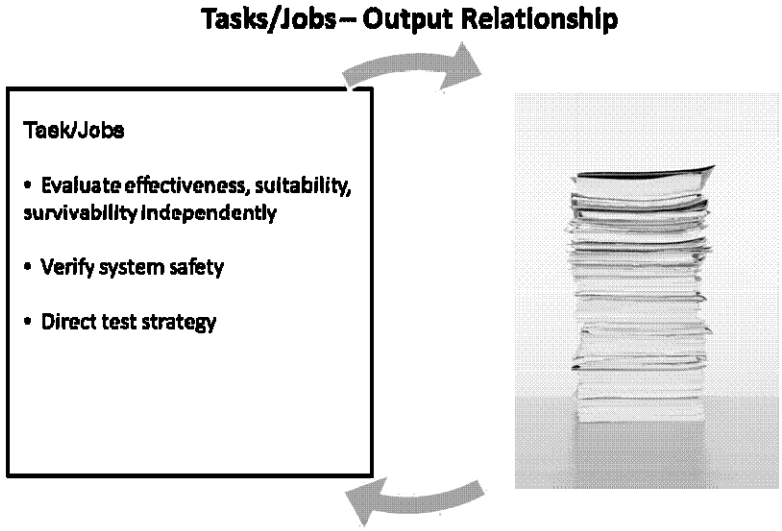


Figure 70. Tasks/Jobs–Output Relationship

3. Tasks/Jobs-Outcomes

The relationship between the Task/Jobs and Outcomes (Figure 71) was analyzed and there is strong congruency.

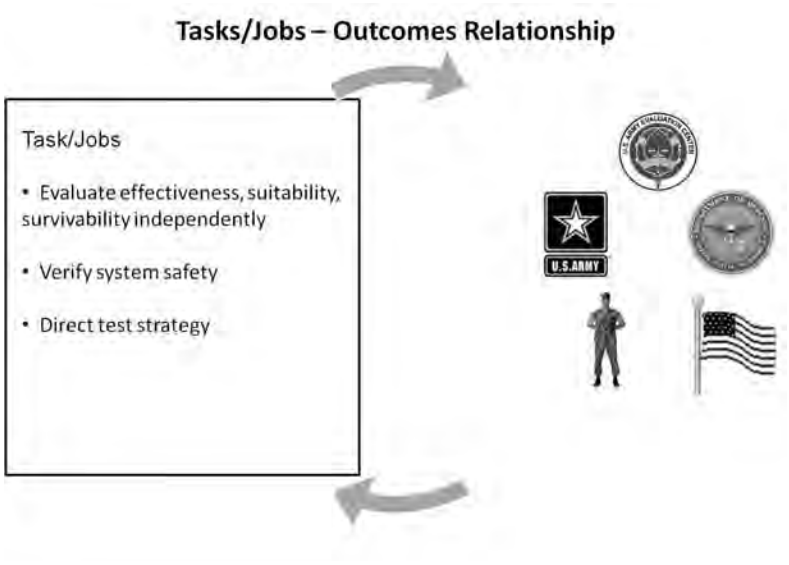


Figure 71. Tasks/Jobs–Outcomes Relationship

4. Technology-Culture

The relationship between the Technology and Culture (Figure 72) was analyzed and there is no relationship and therefore assessed as "NA."

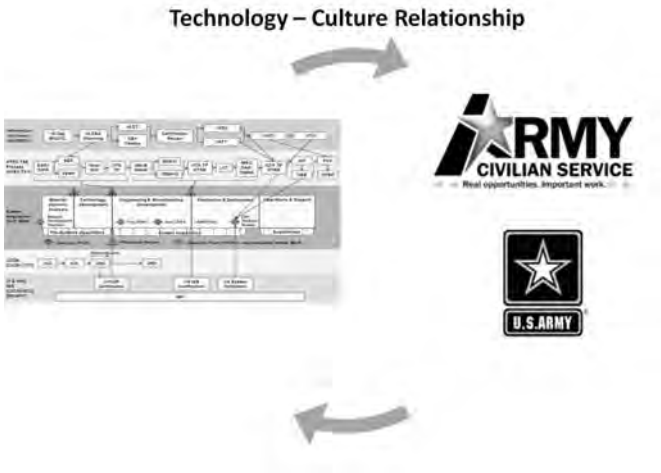


Figure 72. Technology–Culture Relationship

5. Technology-Output

The relationship between the Technology and Output (Figure 73) was analyzed and there is strong congruency. The T&E processes exist solely to product the output.

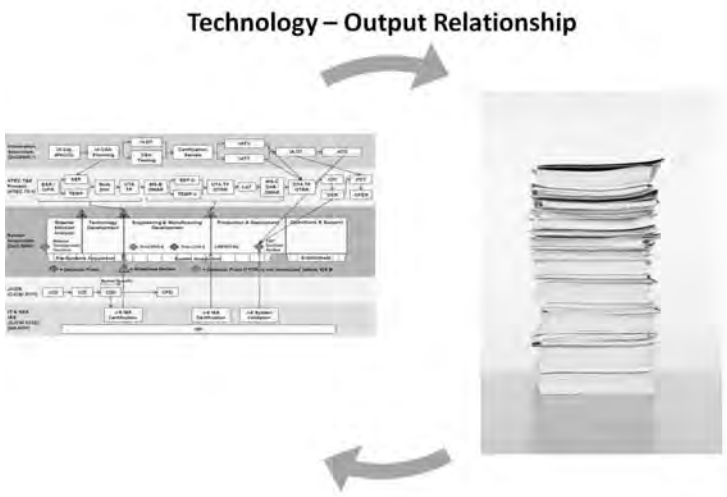


Figure 73. Technology–Output Relationship

6. Technology-Outcomes

The relationship between the Technology and Output Outcomes (Figure 74) was analyzed and there is strong congruency.

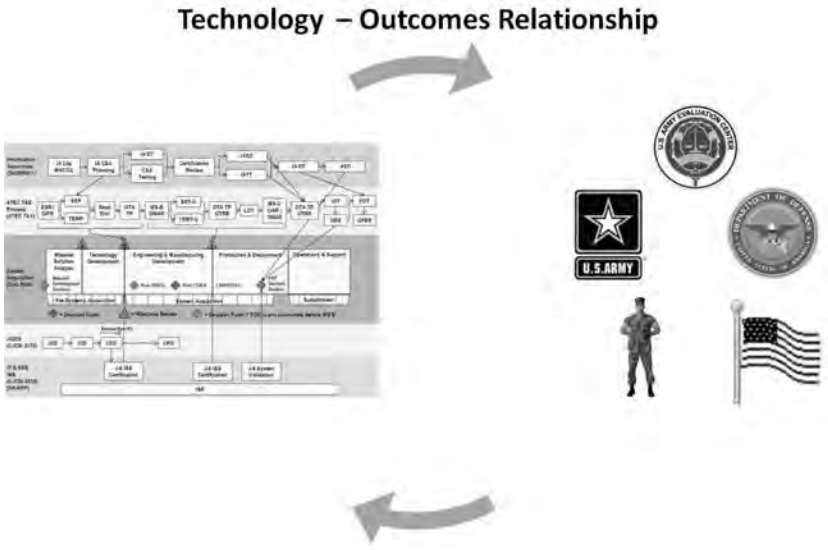


Figure 74. Technology–Outcome Relationships

7. Structure-Culture

The relationship between the Structure and Culture (Figure 75) was analyzed and there is no relationship and therefore assessed as "NA."

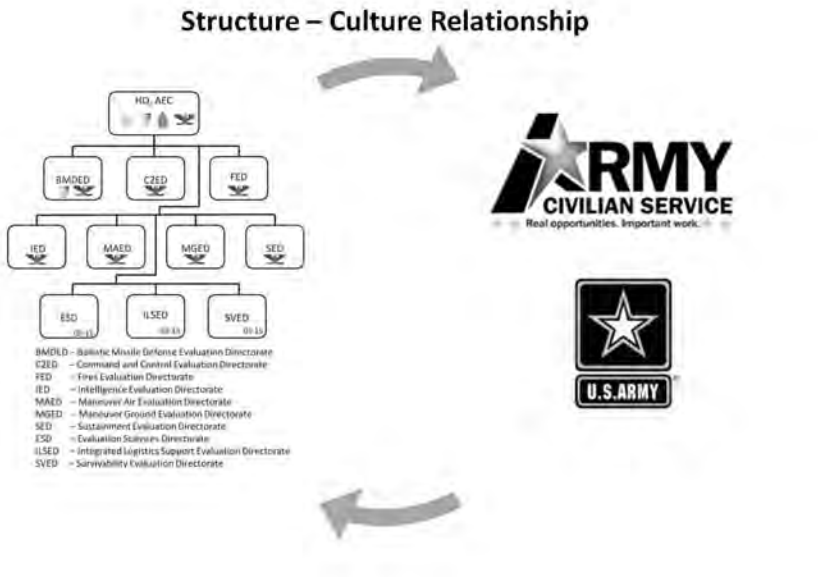


Figure 75. Structure–Culture Relationship

8. Structure-Output

The relationship between the Structure and Output (Figure 76) was analyzed and there is strong congruency.

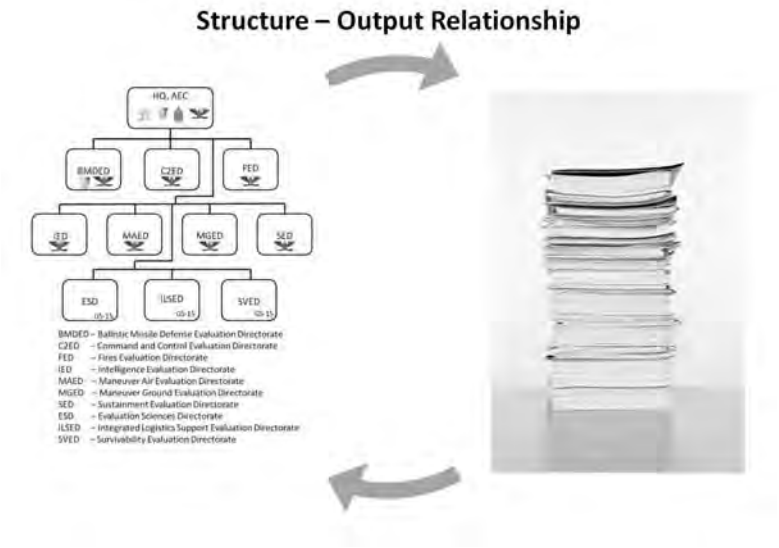


Figure 76. Structure–Output Relationship

The structure supports the product development, which focuses on the effectiveness, suitability and survivability evaluation of assigned weapon systems. However, combining ILS and ESD may be considered to integrate suitability within a directorate.

9. Structure-Outcomes

The relationship between the Structure and Outcomes (Figure 77) was analyzed and there is strong congruency.

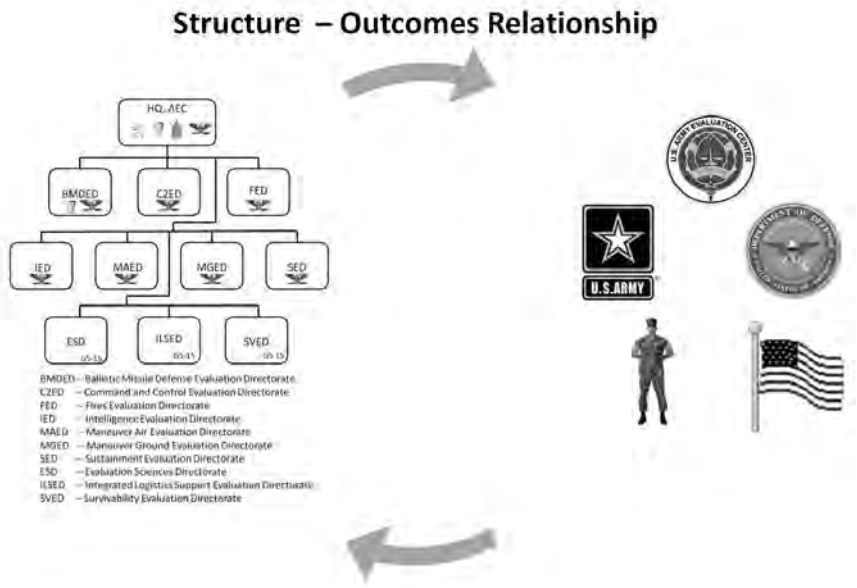


Figure 77. Structure–Outcomes Relationship

10. People-Culture

The relationship between the People and Culture (Figure 78) was analyzed and there is average congruency as the civilian and military cultures occasionally clash due to lack of understanding of the two cultures.

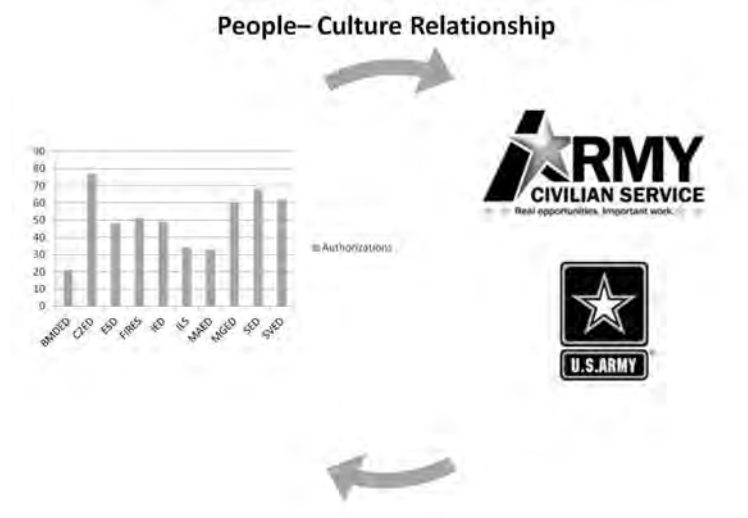


Figure 78. People–Culture Relationship

11. People-Output

The relationship between the People and Output (Figure 79) was analyzed and there is strong congruency. AEC's hybrid workforce of scientists and engineers, Acquisition Corps officers and the operational force produce information required by the decision makers.

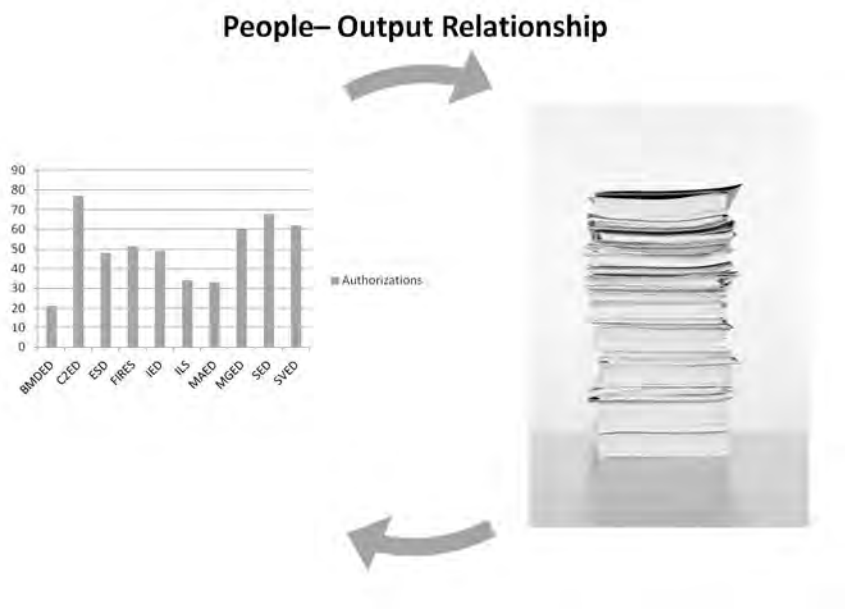


Figure 79. People–Output Relationship

12. People-Outcomes

The relationship between the People and Outcomes (Figure 80) was analyzed and there is strong congruency. The AEC workforce represents the stake holders; from technical engineers assessing performance, to the Acquisition Corps officers managing cost, schedule and performance to the operational force providing the voice of the Soldier in the evaluations.

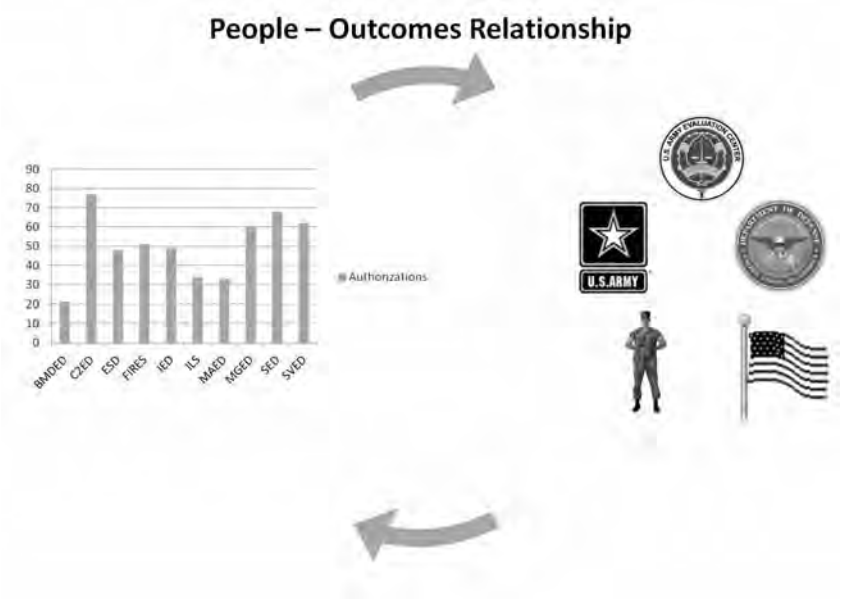


Figure 80. People–Outcomes Relationship

13. Processes-Culture

The relationship between the Processes/Subsystems and Culture (Figure 81) was analyzed and there is average congruency.

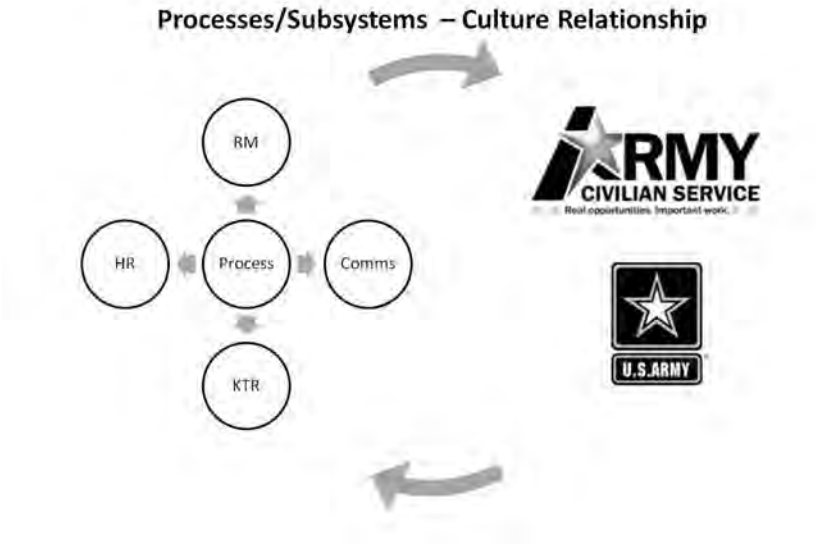


Figure 81. Processes/Subsystems–Culture Relationship

The bureaucracy of the processes conflicts with the military culture at times (ie. results driven vice process driven).

14. Processes-Output

The relationship between the Processes/Subsystems and Output (Figure 82) was analyzed and there is average congruency.

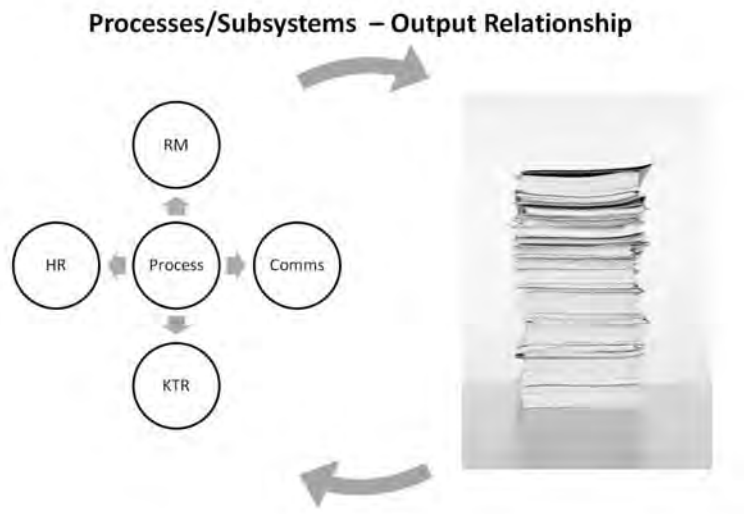


Figure 82. Processes/Subsystems–Output Relationship

Some of the internal staffing processes are impacting the output. Evaluators lose time to evaluate when staffing takes a long time.

15. Processes-Outcomes

The relationship between the Processes/Subsystems and Outcomes (Figure 83) was analyzed and there is average congruency.

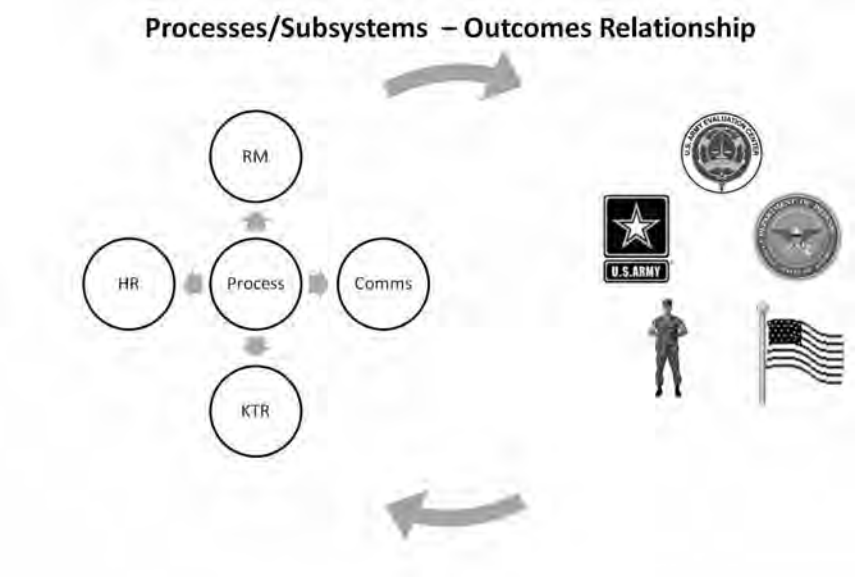


Figure 83. Processes/Subsystems–Outcomes Relationship

The biggest impact of the process/subsystems is the AEC workforce. Many of the internal processes are ad-hoc and unstable. These processes need to be fine-tuned, documented and implemented.

16. Summary of Congruence of Throughput Factors to Results

In Table 22, the summary of congruence between the throughput factors and results is shown.

Design Factors	Culture	Outputs	Outcomes
Task/Jobs	NA	Strong	Strong
Technology	NA	Strong	Strong
Structure	NA	Strong	Strong
People	Average	Strong	Strong
Process/ Subsystems	Average	Average	Average

Table 22. Summary of Congruence of Throughput Factors and Results

The primary areas for fine-tuning of the throughput factors where congruency is assessed as "Average." Findings and recommendations are addressed in Chapter V.

D. SUMMARY OF ANALYSIS

Table 23 is a summary of congruency for all factors in relation to the throughput factors.

Design Factors	Task/Jobs	Technology	Structure	People	Process/ Subsystem
Environment (Political)	**Average**	Strong	Strong	NA	Strong
Environment (Economic)	NA	NA	**Average**	**Average**	**Average**
Environment (Social)	NA	NA	NA	NA	**Weak**
Environment (Technological)	NA	**Weak**	NA	**Average**	NA
Key Success Factors	Strong	Strong	**Average**	Strong	**Average**
System Direction	Strong	Strong	**Average**	**Average**	Strong
Task/Jobs	NA	Strong	Strong	Strong	Strong
Technology	Strong	NA	**Average**	**Average**	Strong
Structure	Strong	**Average**	NA	Strong	**Average**
People	Strong	**Average**	Strong	NA	Strong
Process/Subsystem	Strong	Strong	**Average**	Strong	NA
Culture	NA	NA	NA	**Average**	**Average**
Outputs	Strong	Strong	Strong	Strong	**Average**
Outcomes	Strong	Strong	Strong	Strong	**Average**

Table 23. Summary of Congruence of All Factors with Throughputs

Focus should be placed on the throughput factors where the congruency is assessed as "weak" or "average" with the number of "counts" of "weak" or "average" driving the priority. Table 24 shows the summary of "counts" by throughput design factors.

Design Factors Counts	Task/Jobs	Technology	Structure	People	Process/ Subsystem
NA	5	4	4	3	2
Strong	8	7	5	6	5
Weak	0	1	0	0	1
Average	1	2	5	5	6
Total of Weak & Average	1	3	5	5	7

Table 24. Summary of "Counts" by Throughput Design Factors

In order of impact, AEC's effectiveness and efficiency may be improved by changes to process/subsystems, structure, people, structure and task/jobs.

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V. FINDINGS AND RECOMMENDATIONS FOR AEC

A. INTRODUCTION

The purpose of this joint applied project was to determine if an organization system analysis could be used to provide baseline and key information to leaders. The project applied the OSF model to identify improvements in AEC's efficiency and effectiveness. This chapter presents findings and recommendations for applying the OSF model to AEC.

B. FINDINGS AND RECOMMENDATIONS

1. Finding 1.

Organization system analysis using the OSF model was successful in providing a baseline and key information required to design AEC for the future.

Recommendations:

a. Continue using the OSF to identify future improvements.

b. Focus on the factors that are within AEC's control to change (ie. throughput factors).

c. Focus on the factors with the greatest improvement potential.

2. Finding 2.

AEC achieves a "fairly strong" level of congruence between the inputs, throughputs and results. However, there are two areas where congruency amongst the factors is assessed as "weak" and 19 areas where congruency amongst the factors is assessed as "average" (see Tables 21 and 22).

Recommendations:

a. Establish organizational information program to ensure the AEC workforce is reminded of policies and procedures regarding interfacing with the media. (Environment(Social)-Process/Subsystem)

b. Establish processes and procedures for cybersecurity evaluation and other developmental test initiatives. (Environmental (Technological)–Technology)

c. Emphasize the importance of experimental design and other statistical methods to ensure test adequacy. (Environment (Political)-Task/Jobs)

d. Emphasize the importance of developmental test & evaluation to ensure systems are ready for operational test. (Environment (Political)-Task/Jobs)

e. Establish an AEC coordination cell for managing tasks and AEC corporate efforts.

f. Establish an effective tasking and task management system. (Structure-Technology)

g. Revisit AEC Control points. (System Direction–People)

h. Develop Knowledge, Skills and Aptitudes tailored for the AEC mission. (System Direction-People)

i. Revalidate the number of directorates and divisions. (Economic-Structure, Key Success Factors-Structure)

j. Revalidate the size of the divisions. (Economic-Structure)

k. Develop process to internally reassign civilian workforce to support mission decrease-increase. (Economic-People)

l. Define skill mix required to support emerging requirements such as cybersecurity. (Technological-People)

m. Develop AEC Communications Plan to ensure workforce is aware of impacts of upcoming resource reductions (Economic-Process/Subsystems).

n. Develop a formal "Borrowed Manpower" process to include civilians and military to improve AEC operations. (Key Success Factors–Process/Subsystems)

o. Consider consolidating Engineering Science Directorate (ESD) and Integrated Logistics Support Directorate to support integrated suitability evaluations.

p. Develop the AEC Smartbook documenting the staff processes and procedures to "smooth" the interface with the ATEC HQ servicing staff. (Processes-Culture, Processes-Outcomes)

q. Raise the height of the cubicle farms to allow privacy and quiet. (Technology-People).

r. Develop AEC enterprise reporting (manning, TDA, etc).

s. Establish a Knowledge Management Program; balancing the "need to share" and "need to know"

t. Develop and train conflict resolution processes and procedures.

u. Establish workshops for military in the "science & technology office environment"; similar to the "greening" of civilians.

Recommendations regarding errors in the authoritative systems include:

a. Review TDA for accuracy in Acquisition Corps designation.

b. Update all civilian position descriptions to reflect the current requirements to enable workforce shaping (recruitment as well as VERA-VSIP).

Although this research was successful in analyzing AEC as a system, many of the recommendations warrant dedicated and more in-depth quantitative analysis or consideration from different perspectives.

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VI. CONCLUSIONS

In the wake of sequestration, the Army is faced with the daunting task of ensuring organizations are structured to properly respond to growing demands. In today's operating environment where resources are diminishing, workload is stable and business practices are scrutinized, it is important for organizations to proactively adapt to the changes in the external environments.

The Organizational Systems Framework model used for this Joint Applied Project served as an excellent diagnostic tool to identify areas for improvements resulting in increased efficiency and effectiveness. Applying the model led to a comprehensive report on current activities with recommendation for changes in the future. Although this research was successful in analyzing AEC as a system, many of the findings, recommendations, and conclusions drawn in this paper warrant dedicated and more in-depth quantitative analysis or consideration from different perspectives.

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